AMERICAN VETERINARY REVIEW,

MAY, 1891.

EDITORIAL.

TUBERCULIN IN VETERINARY MEDICINE.—Several months have elapsed since the statement of Dr. Koch, relating to the use of tuberculin in the treatment of tuberculous diseases, was made public; and also the publication of the constituents and preparation of the wonderful lymph. Since that time numerous experiments have been made, and article upon article has been written, either recommending the use of the new therapeutic discovery, or condemning it in the most severe manner. The time has probably not yet arrived to announce, in a positive manner, what are the real advantages to be derived from the use of the lymph; but it is very evident that a great deal of what was expected has failed to be realized.

In one of our late considerations of the subject we expressed our regrets that experiments had not been made on some of our large domestic animals, which, from the fact of their being commonly affected with tuberculosis, we thought would have been excellent subjects to test the value of the tuberculin.

It seems that we were in error, for at the time when we were writing, the veterinary school of Dorpat (Russia), as our friend Prof. Schwartzkopff has informed us, was already carrying out the experiment we were speaking of. It was, however, evident that veterinarians, who could not help observe the value and importance of the subject, would not remain indifferent, and now we read in several of our exchanges reports of the organization of scientific works at the various schools of Europe, and also by some veterinary societies. America has not been backward in the movement, and the following, which we received some time ago from Prof. W. L. Zuill, speaks for itself:

ORGANIZATION OF A KOCH LYMPH COMMISSION AT THE VETERINARY DEPARTMENT OF THE UNIVERSITY OF PENNSYLVANIA.

The members of the Clinical Staff of the Veterinary Hospital of the University of Pennsylvania held a meeting on Saturday, February 14th, for the purpose of organizing a commission to examine by careful and scientific investigation into the value of Koch lymph in veterinary medicine. The commission intend to prosecute the study of this important question with the view of determining its value in three special directions. First: To determine whether or not it is of any value to the veterinarian in diagnosing tuberculosis in cattle. Second: To discover, if possible, what may be its value as a curative agent. Third: To prove, by a series of carefully made experiments, if it be possible to give healthy animals immunity to the contagion of tuberculosis, and for what length of time.

The Commission organized by the selection of Prof. W. L. Zuill, Chairman, and W. Edgar H. Landis, Secretary. The other members of the Commission are Prof. Simon J. Harger, Drs. Chalkley H. Magill, Charles Williams, Wm. H. Ridge, Robert Formad and John Marshall.

Milch cattle, supposed to be suffering from tuberculous, have been procured, and are being subjected to a most rigid examination to determine the presence of the disease. The temperature of these animals will be taken every two hours for at least twenty-four hours prior to the primary injection. The members of the Commission will make a careful physical examination of the animals, and will individually record the facts as they are clinically presented; these records will be compared in making up the diagnosis.

A bacteriological examination will also be made to determine the presence in the milk and bronchial mucous of the bacillus tuberculosis; gelatine cultures will also be made from the milk and bronchial mucous, which should positively identify the bacilli if they be present.

In this way the Commission expect to satisfy themselves that a given animal positively has tuberculosis. The lymph will be injected in comparatively large doses and the temperature and physical signs observed every hour during the

following days and nights; it is expected that high febrile reactions will occur, similar to those noticed in the human family.

Autopsies will be made on these animals and careful macroscopical and microscopical examinations of all the organs of the body will be made in order to learn the effect of the treatment; culture experiments will also be made of these tissues with the view to determine what has been the effect of the lymph upon the vitality of the bacilli contained in them. Other animals in the earlier stages of the disease will be procured if possible and an effort made to cure them. If they cannot be obtained in a stage sufficiently early to be suitable for this purpose, the disease will be produced by inoculating healthy animals with pure cultures of the bacillus tuberculosis, and the curative action of the lymph given a full and complete opportunity to prove its value.

Control experiments will be carried on at the same time. A very important line of work laid out by the Commission is that which is to determine the immunity of treated animals to the disease of tuberculosis. It is to be hoped that this can be established, as it will confer upon mankind the greatest of blessings. Should it be possible to establish immunity in cattle, if only for one year, it will be of inestimable value to the human race.

The hospital authorities have set apart separate and isolated wards for the special use of the Commission in their investigations, and the tuberculoris commission of the University Medical Hospital will furnish the lymph necessary to carry on the work of the Veterinary Commission.

From communications in the hands of the Commission from special correspondents at the Royal Veterinary School at Berlin, it is learned that up to the time of writing no *official* or *extended* investigation as to the value of Koch's lymph in the tuberculosis of animals had been undertaken in Germany.

This investigation undertaken by the Commission of the Veterinary Department of the University of Pennsylvania to determine the influence of Koch's lymph in animals, is the first undertaken in this country. The Commission believe that this remedy of Koch's will prove to be of great value to the veterinarian and agriculturist by enabling them to detect the disease in its earliest stages, when it is so obscure as to evade the most careful physical examination. Should this prove to be true it will enable the stock owner to weed out the diseased stock from his herd even before they can do harm to his healthy cattle, or to the consumers of the products of his dairy.

The opinions of veterinarians whose experience gives weight to their statements indicate that from 5 per cent to 25 per cent of the diary stock of the country is affected with tuberculosis. This is a most serious state of affairs, as tuberculosis is admitted to be a highly contagious disease and is more easily transmitted to man than to other animals from the fact that they consume the milk and flesh of these animals in a more or less uncooked condition. It is therefore a well recognized fact that tuberculosis in man is, to a very great extent, derived from diseased cattle.

And so the work of veterinary investigation goes on. We hope, at a later day, to publish reports from these various working bodies.

That the results in the curative effects of the lymph have failed to be what they were expected is no longer a doubt, and, in this connection, probably experiments in our medicine might be justifiably considered of little advantage. But it is not so much in relation to the curative good that could be obtained that the experiments ought to be made, but to solve the question of the advantages of injections of tuberculin as a means of diagnosis. To us veterinarians this is a most important subject, the difficulties of making a diagnosis by merely physical signs being, we all know, in many instances quite difficult.

It was claimed, at the beginning, that the first result observed after an injection of Koch lymph was a peculiar general reaction, which was always characteristic of individuals affected with tuberculosis, while, on the contrary, it was absent in healthy subjects. How important was this, and how valuable this reaction, if it could be depended upon! But, alas, the reports that come to the medical world from all directions seem to require the abandonment of the hope that reliance could be placed on this feature of its operation, and it appears pretty evident that the general reaction cannot be depended upon as a positive means of diagnosis, it making its appearance in some cases very appropriately, while in others the lymph remains powerless to produce it, having consideration neither for a diseased or perfectly healthy condition of the patient.

In the last *Revue des Sciences Medicales*, Dr. S. Gaillard, after reviewing all that had been written on the subject, says: "The value of Koch's method as to the point of view of the diagnosis and of the treatment of tuberculosis is, for the present, easy to appreciate. It has been proved that if the lymph has a special influence, let us say even specific, upon tuberculous nodules, it may, however, remain ineffectual on phthisic patients, giving rise to neither general nor local reaction; besides, on the contrary, giving rise to reactions, specially general, on tuberculous individuals."

These words seem to be very conclusive that the hopes veterinarians had conceived are not to be realized; but still

there may remain much to be learned. The experiments that have been, and are still carried on abroad and at home, may bring sufficient light on the subject to justify the hopes conceived at the beginning, and, with the writer just referred to, we may say, "tuberculin must leave the arsenal of the practitioner and return to the experimental laboratory, from which it made a premature exit."

PROFESSIONAL COMPLIMENTS TO A VETERINARIAN.—If there is a personal, private satisfaction in doing a good work, this is undoubtedly considerably increased where, comparatively speaking, public acknowledgment of the appreciation of this work is granted to its author. And for this reason our friend, Prof. Huidekoper, has good reason to feel proud of the action taken recently by the veterinarians of Philadelphia in showing him their appreciation of his work in behalf of the profession since he has joined its ranks. Prof. Huidekoper was recently the guest of the veterinarians of Pennsylvania at a dinner offered him by those gentlemen on the occasion of the change he has made in his new field of labor to New York City. The occasion must have been an enjoyable one, and we heartily congratulate our friend for the compliments he received on that occasion, and which none better than ourselves can appreciate, knowing all that he has done for the profession, not only in his own State, but in the country at large, and above all for the Veterinary Department of the University of Pennsylvania. We regret that the proceedings of this little ceremony reached us at so late an hour as to oblige us to postpone their publication until next issue.

PROF. F. S. BILLINGS, V.M.—Among the most recent news of interest which we have to record, that of the reappointment of Prof. F. S. Billings to the University of Nebraska, in the capacity occupied by him some time ago, will be accepted by many as gratifying. Energetic as we know him, hard worker as he has proved himself, some very interesting works can be looked for which may prove of great value in these days of bacteriology.

ORIGINAL ARTICLES.

A CLINICAL STUDY OF ODONTOMES.

By W. L. Williams, V.S., Bloomington, Ill.

(A Paper read at the Annual Meeting of the Iowa State Veterinary Medical Association).

Fig. 3*b* represents the last inferior molar from a small four year horse, affected some two years, and having an external fistulous opening without great enlargement of maxilla. The tooth was trephined down upon and readily dislodged with the punch, but the assistant who was looking after the tooth inside the mouth allowed it to slip from his grasp and it was instantly in the pharynx, and on its road down the œsophagus, lodging at the middle region of the neck. Fearing that the tooth was sharp and jagged, we did not attempt to push it into the stomach nor even allow the animal to swallow it further, but immediately cut down upon and removed it, from an indirect result of which the animal eventually died.

The case represented in Figs 8, 9, and 10 is of unusual interest in several respects, the odontome being of unusual interest, and the checkered career of the animal fitly illustrating the vicissitudes through which a curable animal may pass.

The patient was an aged brown gelding known as Chester B, with a pacing record of 2:28½.

The earliest trace we have of this horse was about 1887 or 1888, when he was owned by Dr. Sutherland, V. S., of Sutherland and Benjamin, breeders of trotting horses at Saginaw, Mich., at which time, when six or seven years old, he appears to have been sound but, according to Dr. Sutherland, was a "puller."

We next learn of him in the hands of a Mr. Long, of same city, by whom he was traded to Mr. O. Woodworth of Bloomington, Ill., before the latter had seen him.

The exchange appears to have been consummated by correspondence and largely upon the professional opinion of Drs.

Stowe and Thwaites, veterinarians of East Saginaw, Mich., who, under date of Jan. 24, 1890, assure Mr. Woodworth that "the enlargement on the right side of face was caused by a caries of the fifth molar tooth, which we removed, and we may also say that the most of such cases make a good recovery in the course of time. The swelling of the nostril is due to Mr. Long's man using a strong solution of acid."

With this history he was presented to us in fairly good general condition three weeks later (14th Feb.) for examination, when he had a very repulsive appearance, somewhat similar but not equal to that depicted in Fig. 9. The right side of the face was enormously swollen, from the eye to the nostril; at the region of the second molar (fifth tooth) there was an opening through the superior maxillary bone about one inch in diameter, surrounded by abundant unhealthy granulations, which bled at the slightest touch. From this opening and the right nostril there was an abundant and very offensive purulent discharge. Inside the mouth, the gums on the affected side were greatly swollen, the first and third pre-molars were almost buried, but could be felt and were drawn out with the fingers. The second pre-molar could not be felt and was supposed to be out, but after several days, when the swelling of the gums had largely disappeared, it was found and taken out, like the others. The fourth and fifth teeth were out, leaving one superior molar on right side.

The other teeth throughout the mouth seemed natural and well-preserved. Those removed were free from caries, but were quite short and the fangs appeared atrophied.

A metallic probe passed into the facial opening came in contact with a rough, hard surface. The animal was secured by backing into stocks, fastening the head by a halter rope to posts on each side and with a twitch on the nose. We freely enlarged the external opening, and clearing away the debris and unhealthy granulations, came upon what was evidently a *very* large odontome. The surface of the tumor was well bared, and after over two hours of hard work with bone chisels, heavy tooth-cutting forceps and a variety of bone-exacting instruments, we succeeded in removing by piecemeal an

odontome consisting apparently of pure dentine, the pieces collected weighing sixteen ounces, the largest of which are represented in Fig. 8. The cavity resulting was thoroughly cleansed with carbolized water and then, to repress the excessive granulations, was firmly packed with cotton wool saturated with carbolized oil and thickly dusted over with iodoform, and the dressing repeated daily for about two weeks.

Improvement was prompt and rapid, the unhealthy granulations disappeared, the fetor and the nasal discharge ceased, healthy granulations appeared, the facial enlargement was rapidly receding and the cavity from which the odontome was removed was filling up, when—much to our chagrin—at the end of two weeks the owner informed us that prior to bringing the horse to us he had offered him in trade (by letter) to a Pennsylvania party, who had accepted his proposition and the horse must go, and accordingly he was shipped to a Mr. Middagh at Mifflinstown, Pa., growing worse on cars from want of proper care. Further neglect seems to have rendered his condition very repulsive and Mr. Middagh, finding him useless except from trade unseen, made a sale by correspondence to Mr. Geo. W. Rice of Springfield, Mass., who bought him as "sound, clean and straight" to quote his language, and soon after delivery (May 6) had the head photographed as in Fig. 9 and then, by advice of the attending veterinarian, Dr. M. E. Chapin, Springfield, Mass., he was destroyed, and thus was brought to an end a very interesting case, which with proper treatment at the right time would undoubtedly have restored to usefulness a valuable animal.

The condition of the bones of the affected side of the head are well shown in Fig. 10, which, owing to the constant and prolonged irritation had become rarified, partly necrosed with here and there large openings which along with the large central cavity from which the odontome was removed, were filled with soft unhealthy granulations at time of death.

In class D, Aberrations of the Whole Tooth Germ, we find but one sub-class—Composite Odontomes, of which we have met with but one typical case in practice.

The patient was a well-formed, very large and vigorous

full blood French draught filly, nearly a year old, and had been noted unwell for some two or three months prior to admission to our infirmary.

The first symptoms noticed by the owner was slight dyspnœa, shown after a short run, and slight swelling over the region of the maxillary sinuses. The dyspnœa and enlargement rapidly increased until at date of admission she was barely able to walk half a mile to and from the cars. There was neither any nasal discharge nor fetor of breath. The central part of the facial swelling was superior to the normal position of the fang of the fourth tooth and, suspecting some form of dental trouble, we trephined well down at the lower border of the swelling, and passing through the ordinary thickness of bone, we came at once upon a *very* hard substance barring our further progress. In enlarging the opening and passing to one side of the hard enamel substance, we permitted the escape of about two pints of a thin, clear, pale-yellowish fluid. After freely enlarging our opening and baring the solid part of the tumor, we placed a punch against it perpendicular to the side of the face, and with several sharp blows with the mallet, broke the tumor from its attachments, but finding it too large for extraction through the already very large opening, it was broken up by the aid of tooth-cutting forceps.

This enamel portion of the odontome was very irregular and weighed about four ounces (Fig. 14 *a*). Adjoining this mass of enamel was a considerable equally irregular mass of dentine, which was next removed in the same manner. A portion of this is shown in Fig. 14*b*.

We now had free access to the large cyst surrounding, from which the fluid had escaped earlier, and found that it had attained such dimensions as to invade all the sinuses on the left side, destroying all partitions and converting all into one immense cavity, completely occupied by the cyst, which had further encroached upon and occluded the left nasal passage, and, pressing hard against the septum nasi, had greatly narrowed the right nasal passage, thus producing serious dyspnœa.

The cyst was thick-walled and quite firm; it was quite free from surrounding parts except inferiorly, where the irregular mass of enamel was found, and as far as possible it was removed by gently withdrawing it by means of heavy dressing forceps.

The outside of the cyst was smooth and covered with mucous membrane, while the inner side was thickly studded throughout, except at point where enamel was found, with numberless rough pyramidal elevations one-quarter to one-half inch in diameter and one-eighth to one-quarter inch from base to apex, and formed of cementum, Fig. 14*c*.

After removal of the cyst the sensory branch of the fifth nerve was seen to be wholly denuded of its bony conduit, through the encroachment of the cyst, and remained loosely stretched across the large cyst-cavity, entirely bare and very sensitive. An accidental wound to this before its identity had been made out occasioned much pain and this, with the exposed condition of the nerve, rendered the animal quite sensitive and troublesome in dressing afterwards.

The same line of after-treatment as described in preceding cases was followed, resulting in prompt improvement, healthy granulations appearing over the entire extent of the cavity in a few days. In about a week the walls of the cavity were rapidly approaching their normal position, the dyspnœa was almost wholly relieved, the outward bulging of the face greatly diminished and on the twelfth day after admission she was discharged apparently on the safe road to recovery. Six weeks later her owner reported her practically well, and a year later the blemish could scarcely be noticed, except on close inspection; the filly having made an excellent growth.

While selecting this series of cases primarily to illustrate their classification and treatment, a careful study of them will indicate some of the leading errors and accidents likely to occur and assist us in formulating some general rules as a basis for action:

1. When an odontome is recognized, no unnecessary delay should be countenanced by the veterinarian, but prompt surgical treatment advised, since early treatment, aside from

the influence on the growth or vigor of the animal, very materially lessens the amount of disfiguration; or, in case of pain on pressure upon the crown of the affected tooth, causing uni-lateral mastication, we may, by long delay, have the very unfortunate extreme beveling of the teeth show in Fig. 8; or, in suppurating odontomes, as already related, especially of the lower jaw we may have death, probably from pyæmia.

2. Never under any circumstances attempt the forcible removal of a tooth until it has been clearly determined that no enlargement of the fang exists, which in being forced through the alveolus may cause serious damage to it, or to the bony palate, as has been related in the cases from which have been taken Figs. 4, 6, and 13*a*, and in Fig. 16.

3. The first step in operating on affected teeth of young horses or others where odontomes may be suspected (except in those cases like in Fig. 5 where the abnormality is clearly confined to the crown and it has been erupted) should consist in a free opening at or near the normal position of the fang of the suspected tooth. This opening having been made by a large trephine three-quarters to one inch in diameter, should be further enlarged by aid of bone-gouging or cutting forceps, bone saw, chisel or gouge, until the character of the odontome is clearly made out, and abundant room for future operations afforded. When considerable enlargement of the bones is present, the opening may be extended almost to the circumference of the enlargement, with a view to diminution of the blemish when the parts have healed. This is especially true of the small follicular cysts in connection with the superior permanent pre-molars, in which we find sharply defined hemispherical protuberances, and of suppurating odontomes in the inferior maxillæ, where there is frequently a very unsightly enlargement. In the latter case, the bulged, thickened bony walls of the abscess may advantageously be cut away until the normal line of the inferior border is reached, although this cutting away may leave an opening into the abscess cavity five or six inches in diameter, after which, as the healing process takes place, the widely separated walls may more readily approach each other and will leave far less

blemish than by using more conservative methods; and it also favors rather than retards the rate of recovery.

4. The removal of the odontome. Pure follicular cysts resting in the facial sinuses need only to be punctured and the contents allowed to escape, after which the cyst is to be carefully removed by grasping with dressing forceps and drawing it out cautiously, avoiding tearing as far as possible. They usually have no such direct connection with the teeth in the alveoli as to so expose the tooth germ as to make the destruction and removal of the tooth necessary. The same may hold true of composite odontomes, as in case of Fig. 14, and in some cases of compound follicular odontomes, even where suppuration of long standing is present; in fact in any class the odontome may be so slightly connected with teeth in their normal position in the alveoli as not to jeopardize their vitality if due care is observed while removing the offending parts. In all such cases and in others before the intimate connection between the odontomes and the tooth in the alveolus has been ascertained, the veterinarian should proceed warily. Whether a tooth is to be sacrificed or not, when the odontome is well bared and any cystic fluid evacuated, the harder parts, consisting of enamel, dentine or cementum, should be comminuted sufficiently to permit its being readily removed. This comminution is best effected by means of the bone chisel and mallet or by various shaped bone or tooth-cutting forceps, according to size, form, etc., of the odontome, and the pieces are most readily detached from surrounding parts by the punch and mallet. The tooth, if affected, should be comminuted until all enlargement of the fang has certainly been removed, and in case of the fifth and sixth superior teeth, all available parts of the tooth should be so comminuted before attempting to force the tooth out, as it permits the punch to be placed at a better angle and renders the final part of the removal of the tooth far less difficult.

Every part of the alveolus and cavity occupied by the odontome is then to be carefully searched in every part for detached pieces of tooth, and all carefully removed. This can usually be easily affected by means of strong dressing

forceps, while in other cases we have found, especially in suppurating compound follicular odontomes, that we sometimes have great difficulty in dislodging firmly adherent flat pieces of cementum or dentine, from the walls of the pus cavity, and in such cases we find the best means to consist of placing a steel punch against the adherent piece perpendicularly and then giving it a short, sharp blow with the mallet, which by causing a yielding of the living walls, detaches the more unyielding tooth-substance, when it can be readily removed with the aid of forceps. The free use of a four-tenths per cent aqueous solution of carbolic acid or one-twenty-fifth per cent of corrosive sublimate with sponge and syringe, greatly facilitates the operation and guards against septic accidents.

5. Unless free dependent drainage is afforded through the alveolus into the mouth or otherwise, this should be provided for by cutting through the wall between the sinuses into the nasal passage and a sufficiently large piece removed to ensure its remaining open. If, through pressure of pus or a cyst, the wall between sinuses and air passages has been pressed against the septum, closing the orifice of communication between sinuses and nostril, the fingers should be passed through the orifice, and the adhesions with the septum broken down. This may be aided by means of any suitable instrument passed up the nostril. Should these means fail to retain the displaced parts in their proper position, a bistoury may be introduced between the septum and wall and the latter divided downwards toward the nostril, as far as desired, and if need be a portion excised, when the redilation of the air passage may be further facilitated by a suitable tampon introduced either from above or below.

6. The dressing and after-treatment should consist of thorough washings daily with a four-tenths per cent carbolic acid solution, careful search for remnants of tooth tissue for several days and plugging alveolus, odontome cavity and external wound with pledgets of cotton or tow, saturated with carbolized oil and for a few days at least, heavily dusted over with iodoform. After four or five days, when the fetor has disappeared, the iodoform may be discontinued, and the plug

not so tightly impacted, bnt the alveolus must be kept well filled until closed up, to prevent the entrance of food into it. Should the external wound close too rapidly it may be enlarged by excising the soft granulations by passing a bistoury around its circumference. If the external wound is of such a nature that the dressing cannot well be retained, a suture of silk tape or silver wire passed through the edges of the wound and across the opening, may be resorted to with advantage, especially in cases of large cavities in the lower jaw.

In securing the animal it should be confined in stocks in the standing position for operations on the superior maxilla, almost without exception, while for the lower jaw the operator will usually find it advisable to cast the patient In such extensive odontomes as those illustrated by Figs. 8 and 14, requiring a surgical struggle of two or three hours, the animal is manifestly far better for being allowed to stand, while the operator also is placed in a better position for his work.

Anæsthetics might be beneficially used in some cases of odontomes of the inferior maxilla, but rarely if ever in those of the superior.

The instruments required for operating are extremely various, including syringes, probes, knives, trephines, bone forceps of varied shapes, tooth-cutting and extracting forceps, bone chisels, gouges, punches and mallet, etc.

The punches should vary in size and design, but all should be made of well-hardened steel, be well polished, and have the distal ends (which are to be placed against the odontome) deeply concaved, with sharp edges, that slipping may be well nigh impossible. This concave end should be about three-quarters of an inch in diameter at the most, which should be somewhat reduced in size for a short distance to prevent its becoming impacted in the alveolus, or other parts. A slight bend about two inches from concave end generally adds to convenience and usefulness. The total length should be eight to ten inches and the distal should be slightly convex. The best mallet we have been able to find is one of wood, with compressed sole-leather ends, which will not split but always affords a firm, smooth striking surface.

Our prognosis in case of odontomes is almost without exception, *very favorable.* No class of surgical operations can well offer safer or more satisfactory results if the operation be properly performed, the errors we have pointed out obviated, and the after-treatment properly carried out.

One point of importance should not be overlooked—the operation should *always* be made on the veterinarian's premises, where all needed instruments and appliances will be at hand, as it can never be told just what will be needed until the work is done. Then the patient should by all means be left in the *immediate care* of the operator until the wound is granulating at every part, as it is next to impossible in many cases, to find and remove, at the time of operating, *all* the detached or diseased fragments, so that they need to be searched for daily for three to six days. A reflecting lamp, by throwing a strong light into the affected cavity, will greatly aid in detecting these overlooked fragments.

EXPLANATION OF PLATES.

Fig 1.—Multilocular cyst, from a two-year-old colt.

a. Fourth superior molar recently erupted, and

b. Fifth superior molar, not yet erupted, both showing by wires inserted, openings from table to fang between the layers of central inversion of enamel.

c. d. e. and *f.* Cyst walls from the fang of fourth molar.

Figs. 2, and 3. Second superior pre-molars from two-year-old colts, which had small follicular cysts in connection with their fangs.

Wires passed through the teeth show openings from table to fang between central inverted plates of enamel, as in Fig. 1.

Fig. 5. Cementoma of corner incisor (inferior).

a. table surface of tooth.

Fig. 4. Cementoma of third superior molar from four year-old-mare, affected two years.

a. Cementum tumor on inner side of tooth.

Fig. 6. Compound Follicular Odontome (suppurating).

a. Antero-posterior view of tooth, showing its beveled condition from unilateral mastication, also the greatly enlarged condition of the fang.

b. View of the inner side of tooth (wearing surface) showing wire passed between the inverted enamel plates, constituting a free communication between the abscess and the table surface.

Fig. 7. Detached pieces of dental tissue from the abscess of Fig. 6.

a. Irregular masses of enamel and dentine.

b. Piece of cementum from same.

Fig. 8. Large pieces from a Radicular Odontome, weighing sixteen ounces, removed from the right superior maxillary region of an aged pacing horse, Chester B., 2:28½.

Fig. 12. Radicular Odontomes of fourth superior molar with early longitudinal splitting, from a three year-old-colt.

Fig. 13. *a.* Radicular Odontome of fourth superior molar with external fistulous opening, from an aged mare.

b. Small Radicular Odontome of last inferior molar from a three year old horse.

Fig. 9. The head of Chester B., three months after the removal of the odontome shown in Fig. 8, showing the odontome cavity and surrounding parts invaded by unhealthy granulations. From a photograph.

Fig. 10. Right superior maxilla of Chester B., showing the large cavity previously occuiped by the odontome partially shown in Fig. 8.

Fig. 14. Composite Odontome, from the region of the fang of the fourth superior molar from a one-year-old filly.

a. Irregular mass of enamel. *b.* Dentine and cementum. *c.* Internal face of cyst studded with denticles. *d.* External surface of cyst, covered with smooth mucous membrane. *e.* Mass of cementum papillæ from interior of cyst.

Fig. 15. Longitudinal splitting of a tooth from lack of cementum between the inverted layers of enamel.

Fig. 16. Oro-nasal fistula from destruction of a part of the palatine bone, the result of an odontome.

KOCH'S METHOD WITH TUBERCULOSIS

AND THE EARLIER USE OF CORRESPONDING PRODUCTS IN OTHER CONTAGIOUS DISEASES.

By James Law, F.R.C.V.S., Cornell University, Ithaca, N. Y.

(A Paper read before the New York State Veterinary Medical Society).

Koch has at last made known the source of his "lymph." It may be called a solution, in a mixture of equal parts of water and glycerine, of the products of the culture of bacillus tuberculosis, or of the growth of tubercle. Stated more distinctly still, it is the poisonous chemical products of the growth of bacillus tuberculosis, or a part of such products. The fact that it is insoluble in alcohol suggests that it is more probably a ptomaine or organic alkaloid of fermentation, than a toxalbumin. To many, doubtless, the revelation will hardly be a surprise. The operation of the poison alike on the active local tubercle and on the tuberculous system, suggested as a factor the poisons normally acting in tuberculo-

a
Fig. 5.
a
Fig. 4
Fig. 2.
Fig. 3.
b
d
f
Fig. 1.
a
c
e

Fig. 6.

a b

Fig. 7.

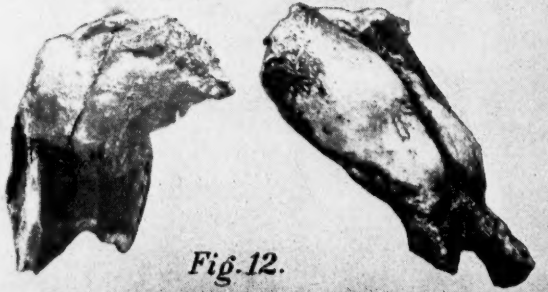


Fig. 12.

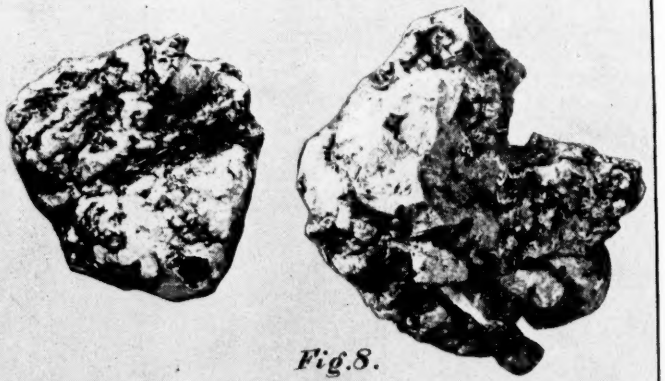


Fig. 8.

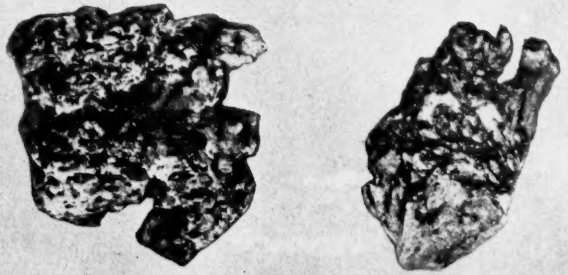
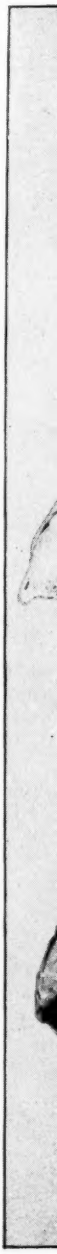


Fig. 8.



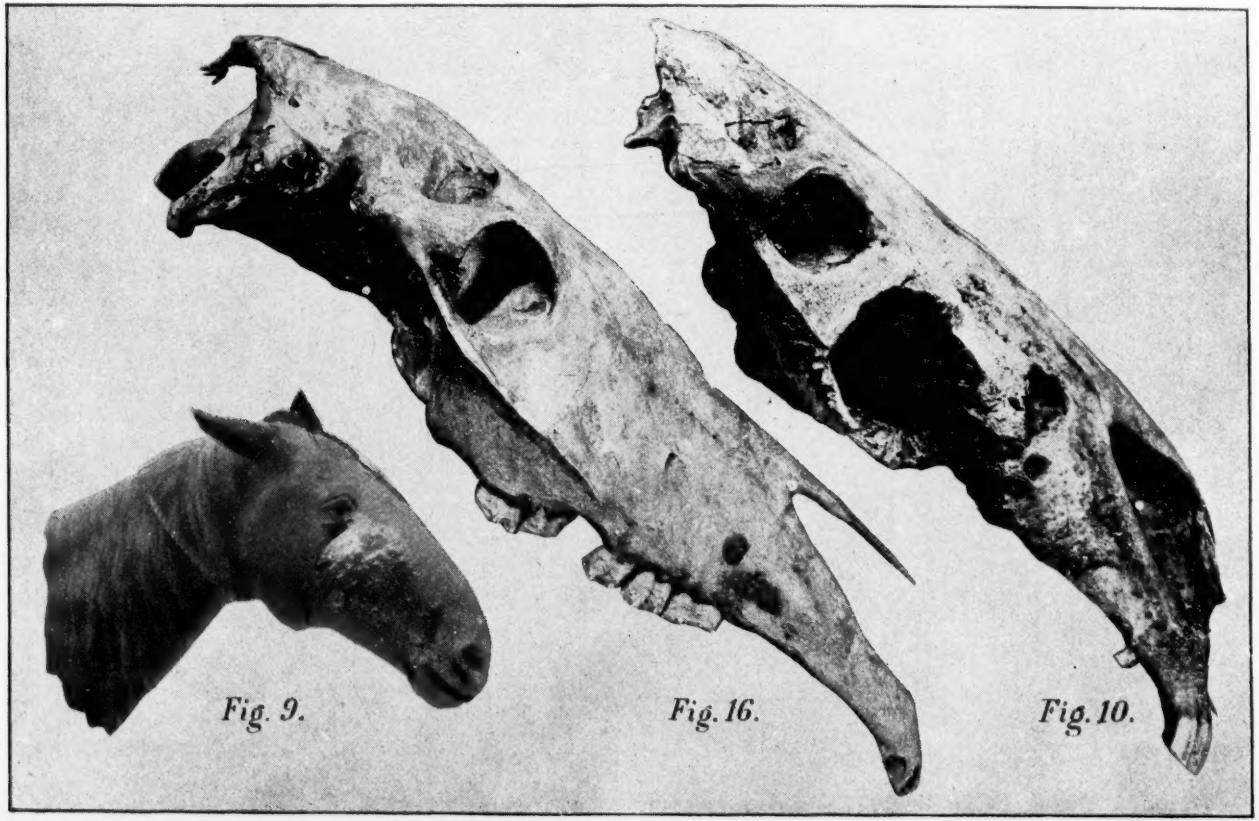
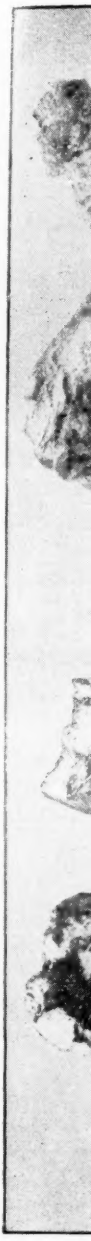


Fig. 9. *Fig. 16.* *Fig. 10.*



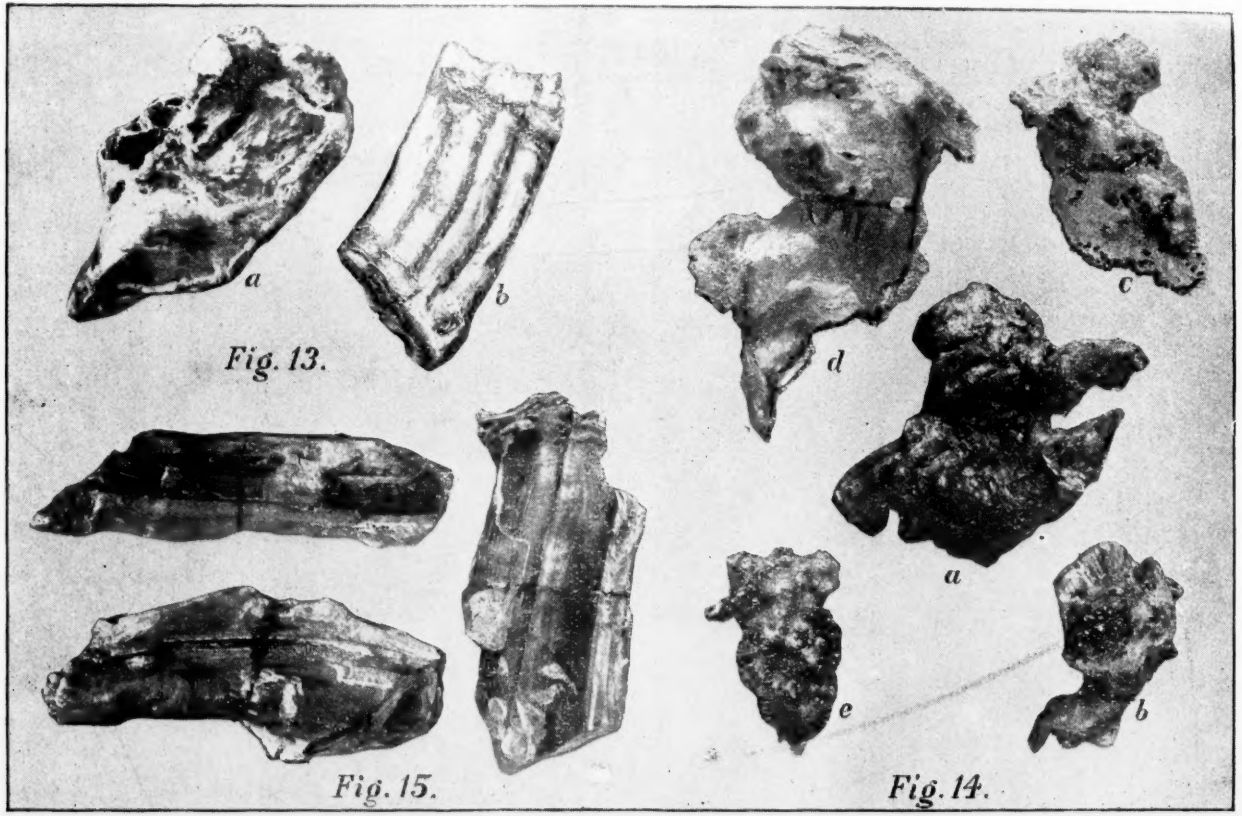


Fig. 13.

Fig. 15.

Fig. 14.

sis, and the analysis by the Viennese chemists greatly strengthened this suspicion.

Now, however, that surmise is changed to certainity, and that the active agent in Koch's "lymph" is known to be chemical poison or poisons produced by the bacillus in vital processes, the question at once arises, have these products ever before been used in medicine? To this the answer is emphatically, yes! The evidence of this I shall give below. Meanwhile let me say that nature herself displays this process in the great class of germ diseases in which the microbe —the living parasitic cause of the disease—does not live in the blood, but confines its attack to one circumscribed area, yet confers an immunity from the attacks of the disease upon the entire system. As instances of this may be adduced cow-pox and lung plague, and mild cases of local anthrax. All the modes of conferring immunity by inoculating weakened or partially devitalized virus, or single germs of the more potent virus, or small doses of virus into the blood, are in the main methods of availing of the same principle. The weakened germ and the single germ alike perish in the seat of inoculation, by reason of their inability to struggle successfully with the more numerous and more potent tissue nuclei, and the migrating blood cells. The germs thrown into the circulating blood are, in the case of certain diseases like lung plague, similarly overcome and devoured by the myriads and myriads of actively moving blood globules, and thus fail to plant colonies in the tissues, and thereby start local disease. What, then, is it, which, permeating every tissue and entering every cell and nucleus, confers upon the whole body a subsequent immunity from the attacks of the inoculated microbe? Manifestly the chemical poisons, the products of the microbe's life, to which these tissues and cells become habituated and insusceptible. Those who avail of these methods may not have recognized the full value of the chemical poisonous products, in the absence of the living germs, hence they have not felt justified in leaving out the dangerous germ itself, yet their results are undoubtedly due to the soluble products which premeate every part of the system, and not directly to

the germ which is confined to the narrow area of tissue where it was inoculated, or, in the other case, to the circulating blood into which it was thrown. More than this, as I hope to show later, the ptomaines and other poisons have been experimentally used in medicine—apart from the living germs—for at least eleven years past, so that the separation of these chemical poisons from their living bacteridian sources and their employment in medicine is not a new thing, nor was the justly famous Koch the first to use them apart from the living microbes for this purpose.

The new departure now made by Koch is not, therefore, the separation of the ptomaines and tox-albumins from the living microbes for medicinal use—that had already been accomplished—it is rather the application of such separated chemical poisons to the cure of already existing disease. Koch's departure has been the introduction of these agents intg the field of therapeutics,—they had already been introduced into prophylactics.

The only apparent exception to this is in the method of Pasteur, for the protection of the individual bitten by a rabid animal. But this is no real exception, because, first, the Pasteurean inoculations for rabies are not made with the chemical products alone, but with these plus the microbes, at first of a low vitality and potency, and then day by day of a stronger and stronger quality: 2d, The Pasteurean inoculations for rabies and prophylactic being intended to habituate the brain and other nerve centers to the action of the soluble chemical poisons, while the living microbe is still confined to the region of the bite, so that such centers shall have acquired an insusceptibility before the living germ can reach them in a viable condition. The tardy progress of the microbe of rabies to the nerve centers is based on the fact that the blood is highly inimical to the life of this germ.

From the standpoint of this role of the ptomaines, etc., I propose to shortly canvass Koch's method and some of its precursors, and to inquire into a number of the successive steps through which the science of medicine has advanced to its present state in this line of prophylaxis, and, it must now

be added, of treatment. With this in view, it may be well to trace some of the leading landmarks in the gradual discovery of those poisonous products now known as enzymes and ptomaines. Strangely enough, the belief in chemical poisonous products antedates by many years the recognition of living germs as the cause of disease. Poisoning by decomposing meat and fish had long been a familiar occurrence when, early in the eighteenth century, Haller experimented by injecting watery extracts of putrid material into the veins of animals, and found that death resulted. In 1820, Kerner, investigating the question of poisonous sausage, came to the conclusion that the toxic principle was a fatty acid combined with a volatile principle. Others pursued similiar investigations, but it was only in 1856 that Panum positively demonstrated that the poison was a chemical product, which was soluble in water and capable of filtration from other and insoluble bodies. He found in the decomposed flesh of the dog a toxic product, soluble in water, insoluble in alcohol, non-volatile and indestructible by boiling. Of this chemical poison, 0.012 of a germ proved nearly fatal to a small dog. Panum, however, went further and succeeded in isolating another chemical poison from the putrid meat which was easily separable from the first by the fact that it was soluble in alcohol. This alcoholic extract injected into a dog's jugular threw him into a sleep for twenty-four hours, after which he awoke in apparent health. To Panum, therefore, we owe the first recognition of two classes of products of bacteridian growth, which act on the animal system as chemical poisons and which have now come to be recognzied as ptomaines (cadaver), which are basic or alkaloidal and toxic albuminoids of a non-basic nature.

Following Panum, came Weber, Hemmer, Schwenninger, Bence-Jones, Depre, Marino-Zuco, Bergmann, Schmiedeberg and others, and the true basic or alkaloidal nature of the product which is precipitated by alcohol, established.

The poisonous property of these chemical products, even after a prolonged exposure to heat, which must have killed any living germs, for a time antagonized the theory of

causation by living germs, and so late as 1879 such an accomplished observer as Dr. Lewis argues for the absence of living germs in septicæmia on the ground that septicæmia poisoning can be produced by these purely chemical products.

But the permanence of this theory was impossible. Chauveau, Bert and Toussaint showed in the case of anthrax that the filtration of the virulent liquids through an unglazed earthenware filter rendered the filtrate non-infecting, while the solids retained in the filter retained their full potency. They further demonstrated that an overdose of the filtrate was speedily fatal, killing the animal in twelve hours, while a dose of the solids left on the filter did not kill until after thirty hours. Here we had at once the prompt poisoning by an excessive dose of the chemical poison, and the slower poisoning by the implanting of the anthrax germ and the slow production and increase within the system of the same chemical poisons as the germ grew and multiplied. Koch has obtained similar results with putrid flesh inoculated on mice.

To those who had been following the course of experimentation, the field was now clear for a further advance, and such further advance had, indeed, become inevitable. A number of facts and observations testified that it was to the chemical poisons we must look for the direct toxic agents, while the microbes acted mainly as the producers of such deleterious chemical products. In many cases like cowpox, the microbe might be confined to a circumscribed area of tissue, but the soluble chemical products pervaded the whole system and rendered every tissue immune from future attack. In some cases, indeed,—as in cattle lung-plague—the blood had been proved to be fatal to the germ, while this remained confined to the part, tail or lung, where it had been implanted, but, in case of survival, no tissue in the body would thereafter furnish a favorable field for its inoculation and growth.

It was inevitable that the next step should be taken—that of applying the devitalized chemical products of the microbe of a specific disease to render the system proof against such disease; and it was natural that Toussaint should be the first to enter the field. Devoted as he was to this line of experi-

ment at government expense in a national school of veterinary medicine, he had satisfied himself that the survivors of an attack of anthrax did not contract a second attack when exposed or inoculated. He, therefore, in 1880, instituted experiments on sheep by heating the virulent anthrax fluids to 55° C., for from ten to fifteen minutes, and with this product inoculating the animals to be protected. In a short time he had ten animals thus inoculated, that resisted all ordinary inoculations with anthrax virus. Then a crucial experiment was instituted at Alfort, in which twenty sheep were inoculated with his heated anthrax liquids, and unfortunately four of the number died of anthrax. Sixteen survived and these after proved insusceptible to anthrax. The partially unfortunate result and Toussaint's increasing ill health would appear to have deterred him from further advance in the same line, and no other European observer seemed then to appreciate the value of his results.

Experiments were, however, being made in the same direction in America. Dr. Salmon was, in 1880, experimenting on fowl cholera and I was dealing with swine plague, both for the National Department of Agriculture. Each, independently of the other, undertook to test the protective action of the ptomaines. Dr. Salmon's observations on the chicken disease led to negative results, the ptomaines being either volatile or destructible by heat.

In my experiments with swine plague I was more fortunate. But to show my views at that date and the results I obtained I shall quote from the Department of Agriculture Report on Contagious Diseases of Animals. 1880–1, pp .135–146.

"BACTERIA INTOXICATION AND BACTERIA INFECTION.

"In all diseases caused by microphytes, there are two associated but distinct deletereous agents to be taken into account: 1st, the organism which is introduced from without and multiplies in the body of the patient; 2d, the chemical products elaborated by the growth and increase of the imported organism at the expense of the vital liquids. The two have been aptly named bacteria infection and bacteria intoxication. Each may be injurious and even fatal, yet each has

its special mode of action and its limitations, so that we can estimate with a reasonable amount of certainty the probable results in the two cases.

"In bacteria infection the self-multiplying organism is introduced into the body, and if it finds a suitable field for its growth it undergoes an indefinite increase, and may undermine the health or destroy life in one of various ways; for example by accumulating in the capillaries, arresting the flow of blood and abolishing the functions of vital organs, or leading to local abscess or gangrene; by abstracting oxygen and other essential elements from the blood, and resolving this vital fluid into a poisonous in place of a life-giving stream; or by reproducing itself in myriads, elaborating a vast amount of noxious chemical products and killing by poisoning. The bacteria intoxication or poisoning, on the other hand, is effected directly by the products of the growth of the bacteria, or in other words, by a chemical compound incapable in itself of reproducing or increasing its substance. The respective powers and limitations of the two poisons may thus be mapped out wifh great clearness.

"It is manifest that from bacteria infection may be derived all the evil results of bacteria intoxication, in addition to certain pernicious actions peculiarly its own. The germ being a living organism, with limitless powers of growth, it is manifest that apart from the power of the system to support it, there can be no bound to the amount of chemical poisonous product it may generate, and thus to its own special work of destruction of the essential constituents of the blood, deoxidation of the vital fluid, plugging of vessels, local abscess and gangrene, it must ever add the poisonous influences of its purely chemical products. But it has its limitations as well, which do not belong to its products. In several bacteridian diseases the system will not sustain nor nourish the bacteria with the same readiness a second time, if at all. The system that has once sustained an attack does not readily succumb to the same again. An incompatibility or antagonism has been established between the system thus protected and the bacterium, and henceforth the system may be repeatedly inoculated

with the bacterium with the most perfect impunity. This cannot be said of the chemical products of the bacteria growth. These, like all chemical poisons, will act again and again upon the same system with little difference in effect and, if a partial tolerance is acquired, it can only be to a limited extent and after long exposure to their action, as tipplers acquire a tolerance of alcohol, or opium or arsenic-eaters of these respective poisons. Kill the microphytes in the infecting bacteria liquids and the chemical products will act in exact ratio with the dose administrated, and no amount of experience with the poison will prevent an excessive dose proving fatal. The action moreover will be prompt, and if it does not produce fatal results at an early stage, it will gradually subside, for since the poison cannot multiply itself its effects must steadily decrease with its elimination from the system. With bacteria infection, on the other hand,the evil effects must be somewhat delayed to allow the reproduction of the germ and the production of the chemical poison, and thus the disorder of the system will undergo a progressive development. In another respect we may conceive of bacteria infection being limited in its evil results. If the bacteria increase slowly, the system will be likely to become somewhat habituated to the influence of the poison and insusceptible to it, so that by the time the disease reaches its height the system may be able to bear with impunity a quantity of the poison that it could not have tolerated had the same amount been introduced suddenly and before the economy had become inured to its influence.

"In illustration of the separate action of the bacteria and their products Koch's experiments on mice with putrid fluids are most instructive. * * * Koch injected putrid liquids under the skin of the mouse, and found, when the amount used had been excessive, that the mouse died in a few hours from the effects of the chemical poison, and that not a bacillus could be found in the blood within the vessels. If, on the other hand, a minimum amount of the putrid liquid was used, as by making a slight scratch with a lancet, the tip of which had been dipped in the liquid, and if the mouse survived the

primary danger of death by the chemical poison, it died in the course of about two days of bacteria infection and the blood was found swarming with bacteria. Similarly Chauveau found the Algerian sheep, that are naturally insusceptible to anthrax and which successfully resisted inoculation with a minimum amount of the virus, fell victims to the disease, when an excess of the poison were injected under the skin, or if a second and third inoculation were practiced before the effects of the first had passed off. Finally Cossar-Ewart, and Burdon-Sanderson found that when anthrax liquids had been devitalized by exposure for some time to compressed oxygen (12 atmospheres)and when the germs had lost their power of propagation and increase, the fluid still proved injurious, and even fatal to animals on which it was inoculated. With the vital germ destroyed these evil effects could only come of the remaining chemical poisonous products, which retained their original potency.

"My own experiments with the virus of hog-cholera tend to establish the same fact in that disease. When I had subjected the virulent fluids for an hour to a temperature oscillating between 130° and 140° F., and then inoculated them on the pig, I found that the result was a certain amount of constitutional disorder and ill health, which did not, however, go on to a fatal issue. * * * Similarly when I injected into the system large quantities of the virulent fluids, I found that death took place almost without exception, even in animals that had resisted ordinary inoculations. Of this mortality we may find an explanation in the febrile state of the system induced by the presence of the chemical poisons. * * * It is not the increase in the number of the bacteria alone, nor the access of fresh, and therefore more potent germs, that have the evil effects, for in the infected system there is practically no limit to the multiplication of the bacteria, and these, in place of being weakened, are often rendered more potent by passing through a succession of animal systems. * * *

"'Is future protection secured by the action of the chemical products alone, or is the presence in the system of the bacteria essential?' Under this head are discussed the doctrines of immunity by elimination of systemic products necessary to

feed the microbe; by the deposition in the tissues of poisons inimical to the microbe, and of condensation of the lymph channels and glands, the first two being contradicted by the growth of the bacteria in the bouillon made from the flesh of an insusceptible animal, and their growth in a flask charged with their chemical products, provided fresh meat infusion is introduced. The third theory is disproved by the fact, that different bacteridian diseases, all alike resulting in such condensation of lymph channels, are not mutually vicarious of each other. The doctrine of physiological resistance is shown to agree with all the facts and the immunity of the calf whose dam has passed through the bacteridian disease in the latter period of the gestation is especially dwelt on as evidence.

"This view is further strengthened by the fact that though an animal that has acquired an immunity from a specific disease, afterward produces offspring which are susceptible to the disease in question, yet it has been shown in the case of anthrax that, if such immunity on the part of the parent has been acquired by a non-fatal attack of the affection during advanced pregnancy, the preservative effect is extended to the fœtus as well. Here the fœtus has advanced beyond the condition of an ovum, or of simple embryonic cells or tissues, and is already well formed, with all its differential bones, muscles, tendons, brain, nerves, vessels and viscera. The nuclei presiding over the growth of these different structures are henceforth fixed in their powers, and any habitude impressed upon them may now be permanently preserved just as it is in the adult animal.

"This consideration serves to fortify the doctrine that the immunity from a contagious disease acquired by a first attack is due to a habit, or acquired powers of endurance or resistance on the part of the living cells or nuclei of the animal body. This better accords with and explains observed facts, and is liable to fewer objections than any theory that has come under our notice. * * *

"To return to our question. Do the observed facts accord best with the idea that protection is acquired by the action of the chemical products only of the bacteria, or is the

presence in the system of the bacteria essential? As the question appears to us everything serves to support the first conclusion. * * * The facts attending the acquired immunity of the advanced but unborn offspring of an anthrax mother seem to be almost conclusive on this question. The blood of the dam (cow) may be swarming with bacteria, but these have never been found in the blood of the fœtus. It is only reasonable to conclude that they have never entered the body of the fœtus, or if otherwise, that they have perished very soon after they entered. The chemical products, on the other hand, being soluble in the vital fluids, presumably enter the fœtal system along with the maternal secretions. The offspring, when born, proves refractory to anthrax, so that there is the strongest presumption that it has been fortified by the action of the chemical products of the anthrax upon its system before birth. In this case immunity cannot well have resulted from any action of the growing and multiplying bacteria on the blood or living tissues, for the evidence is all opposed to their presence, at any time, in the fœtal system, much more to their growth and propagation there. Yet here, unquestionably, the disease in the mother has produced an insusceptibility in the fœtus, such as would occur had it been itself the subject of the disease. It follows almost of necessity that the introduction into the system of the chemical products of the bacteria is equivalent in a protective sense to the introduction of the bacteria themselves. But the mere chemical products cannot undergo increase in the system; therefore we can graduate the dose of these as safely as we can a dose of opium or rhubarb.

"With this presumptive evidence we are prepared to study the direct results of the introduction into the system of the chemical products of anthrax and swine-plague, made with the view of securing an insusceptibility to these respective diseases in the future."

Here follows a record of Toussaint's experiments with anthrax, which need not be repeated.

MY RESULTS WITH SWINE-PLAGUE.

"A pig was injected with one drachm of virulent swine-

plague blood, which had been repeatedly heated to 130°, 150° and 200° F., and a month later with an equal amount of virulent blood, which had been raised to 130° F. for thirty minutes, and the day following for three hours. This caused some loss of appetite and appearance of ill health, but no very appreciable fever. Thirteen days after the last operation this pig was placed in a small pen with a pig suffering from swine-plague, and at intervals of a month was twice inoculated with the virus of swine-plague, but all without evil consequence.

"Another pig was injected with a drachm of the mucus-covered fæces of a pig suffering from swine-plague, the infusion having first been filtered and heated for one-half hour to 130° F. until all movement of the contained bacteria had ceased. As in the other case, there was some evidence of ill health, but no material fever, and on the thirty-eighth day the subject was placed in a small pen with a sick pig. Afterward, at intervals of a month, it was inoculated with (swine-plague) virus, but successfully resisted, and maintained good general health.

"A third pig was injected with a drachm of pork infusion, which had swarmed with bacteria resulting from an inoculation with infusion of putrid maize. Before inoculating upon the pig the pork infusion was heated to 140° F. for three hours in succession. There resulted some derangement of health, slight fever, and a local swelling in the seat of injection. When this had subsided, on the fourteenth day, the pig was placed in a small pen in company with a diseased one. Nine days after she had a sharp attack of swine-plague, which lasted eighteen days and led to much loss of condition. Later, at intervals of a month, she was twice inoculated with active virus of swine-plague, but on each occasion without any further ill result.

"On the last occasion of the inoculation of these three pigs a fresh pig was inoculated with the same virulent matter, which caused considerable fever, with a temperature varying from 104° to 106° F., but from which the subject finally recovered.

"Here, then, we have two pigs protected from the noxious

action of the swine-plague virus, by being first brought under the influence of the chemical products resulting from the growth of this virus in the system. We have, further, another pig treated in the same way with the products of an ordinary putrefactive fermentation in a pork infusion, which had been similarly devitalized by heat, but this fails to secure the same immunity, and this pig suffers severely from swine-plague when made to cohabit with a victim of that disease. Later, this pig and the two others successfully resist two successive inoculations with swine-plague virus, while a fourth pig inoculated with this same virus sustains a considerable, but not a fatal attack.

"The experiments, it is true, are limited in number and liable to the objection that the results may have been accidental coincidences, yet, so far as they go, they support the theory that the chemical product of the swine-plague germ, when deprived of its living microphytes, affects the system so as to render it for the future insusceptible to the attacks of such germs. When taken in connection with the fact that swine-plague rarely recurs in the same individual, that, as in the case of other diseases that attack the same animal but once, the most rational explanation is that it is the deleterious products of the disease germ and not the germ itself that affects the system so as to secure this immunity; and finally, considering that in the closely allied disease of anthrax Toussaint has secured a similar insusceptibility by an identical process, it is altogether reasonable to suppose that we are here furnished with a system of prevention which, if carried into general practice, would reduce our present losses from swine-plague to a comparatively insignificant figure."

The report goes on to show the danger of popularizing this method, since all the fatal diseases of hogs vulgarly but mistakenly known as hog-cholera would be resorted to for the protective ptomaines, with unsatisfactory results. Also that protection from all these varied fatal swine diseases would be vainly sought by the use of the ptomaines of swine-plague. Then follow summaries of needful precautions and of the manifest advantages and disadvantages of the method.

PRECAUTIONS TO BE OBSERVED.

"1st. See that it is the genuine swine-plague that is being dealt with. This is equally necessary as to the disease to be prevented and as to the virus which is to be devitalized for preventive inoculation.

"2d. The virulent fluid to be devitalized may be the blood of a diseased animal, or the liquid exudation into a diseased organ, including the lumen of the bowel. In such cases it is best taken at the height of the disease rather than from a partially convalescent animal, in which the virus may have disappeared and the structural changes only may have been left. If from a cultivation in pork infusion, that should have been prepared with all due precaution against the introduction of air bacteria, and with access to air, but which air should not much exceed one-fifth of its bulk.

"3d. In exposing this fluid to heat, that should be carried to 140° F. and retained at that temperature for an hour or more, until, in short, all indications of life in the contained mycrophytes have ceased.

"4th. Swine to be operated on must be kept apart from all diseased hogs, infected places and objects, for with the presence of the living germ in the system the injection of the devitalized chemical products only tend to aggravate the attack. For the same reason all inoculated animals showing symptoms of a severe attack, and presumably suffering from bacteridian infection, in place of the simple intoxication with the chemical products, should be at once removed from the herd operated on.

5th. "In inoculating the devitalized chemical products, the injection of a small quantity at a time and its repetition at intervals of three days or a week promises to be safer and more effectual than one large injection. The injection of ten or twenty drops at a time, and its repetition once or twice, would probably secure a greater immunity with less loss of condition and progress than if a large amount were introduced at once.

"6th. The animals operated on should be carefully guarded against infection for three weeks after the last injection of the

devitalized virus. The presence of the chemical poison in the blood and the attendant constitutional distubance invites rather than debars the growth of the plague germ; hence the latter must be excluded until the former has been entirely eliminated. For the same reason the free use of disinfectants in the operating yards and buildings will be of the utmost value. So will every conceivable precaution against the introduction of disease germs through accidental channels, as by other animals, by the pork, stolen by dogs, as carried by men, etc.

ADVANTAGES PROMISED BY THIS METHOD.

"1st. It offers immunity from a fatal disease by a method which does not entail the propagation of the living germ in the system of the animal to be protected.

"2d. It avoids the risk of the preservation, amplification, diffusion or increase of potency of the disease-germ, all of which contingencies are possible in inoculation with a mitigated virus.

"3d. It does away with the necessity for an exhaustive disinfection after the animals have been inoculated and have recovered from its results.

"4th. The dose of the devitalized chemical products can be so graduated to the strength of the animal that there will be no risk of a fatal result. When once the mitigated living germ is introduced there can no longer be any certainty that it will not reproduce itself to a dangerous extent, or that, owing to the special condition of the system or of its surroundings, it may not suddenly assume its fatal type; but with the devitalized chemical products we can graduate the dose so as to secure as great a certainty as in the case of a dose of castor oil or epsom salts.

"5th. The system can be habituated to the poison and fortified against it by a succession of small doses, no one of which is at all dangerous in itself; whereas if a living germ were once introduced, though of mitigated power, it may increase so as to develop a power that is altogether unexpected.

DISADVANTAGES AND DRAWBACKS.

"These are few apart from the certainty that, if largely resorted to, it will be misapplied by many, to other diseases than the genuine swine-plague, and will thus fall into disrepute.

"It can do no good, but only harm to animals that are already infected, as it can only add to the deleterious products with which the germ is charging the system.

"Its effect can only be evil if the subjects are allowed to become infected before the chemical products have had time to fully affect the system, and to have become eliminated. If this is neglected, and early infection is allowed it can only add to the mortality.

"There is the additional disadvantage that to secure the protective products, the production of a virulent germ must be kept up either in the bodies of a successive series of diseased pigs or in an infusion of pork. The slightest carelessness with regard to the seclusion of these fields of poison, or as to the disposal of their products, may easily become the occasion of a spread of the worst type of the plague among unprotected animals."

I have quoted thus at length to show that at that date it was with me no mere chance suggestion but a settled conviction, based on my own successful experiments and the long series of experiments by others, which led up unmistakably to this conclusion. And this at a time when Koch, whose experiments on mice had directly indicated the principle availed of, had not yet apparently grasped the true significance of the ptomaines in conferring immunity, and when Toussaint, who was the first to apply the principle, had been nonplussed by the unlooked-for results of the Alfort experiment, and led to conclude that his former successes depended on a retained vitality in the virus employed.

In the Department of Agriculture Report for 1882 Dr. Salmon again records his lack of success in this method in chicken cholera and, while accepting the principle that immunity is naturally secured through a power or resistance ac-

quired by the living tissues by continuous exposure to the action of the poisonous ptomaines, he specifically denies the possibility of any profit from the use of small doses of the latter. On page 310 of the Department Report he says: "That this method was entirely inefficient, however, was completely demonstrated, and the conclusions of Toussaint and others shown to depend on wrong interpretations of the facts observed."

DR. SALMON'S SUCCESS WITH SWINE-PLAGUE.

Dr. Salmon seems to have returned to this method in December, 1885. In a paper read before the Biological Society of Washington, Feb'y 20th, 1886, and contributed by Drs. Salmon and Smith, these gentlemen record their experiments on six pigeons with swine-plague virus sterilized by heat (50° C. for ten minutes). One pigeon (No. 8) which was infected with 8 cc. of the heated culture fluid, and fifty-one days later it was inoculated with 75 cc. of strong swine-plague virus, with the result that it died in forty-eight hours. A second pigeon (No. 10,) was injected with 4 cc. of the heated virus, and on three subsequent occasions at intervals of twenty-eight, eight aud eight days it had an inoculation of 15 cc. of similar heated virus, and on the seventh day succeeding the last injection it had an injection of 75 cc. of strong virus, but remained well. The other pigeons had injections of 15 cc. of the heated virus on three occasions, with intervals of eight days, and a third had two injections of the same amount with an interval of sixteen days, and seven days after the last each was injected with 75 cc. of strong virus, but all remained in good health. Finally a check pigeon which had not been injected with the heated virus was the same day with five others injected with the same amount (75 cc.) of strong virus and died in twenty-four hours. They thus sum their conclusions:—

"1 st, Immunity is the result of exposure of the bioplasm of the animal body to the chemical products of the growth of the specific microbes which constitute the virus of contagious fevers.

"2d, These particular chemical products are produced by

the growth of the microbes in suitable culture fluids in the laboratory as well as in the liquids and tissues of the body.

"3d, Immunity may be produced by introducing into the animal body such chemical products that have been produced in the laboratory."

(*To be continued.*)

TRACHEOTOMY AND LARYNGEAL INJECTIONS IN AFFECTIONS OF THE THROAT.

By J. C. MEYER, Sr., V.S., Cincinnati, Ohio.

(A Paper read before the Ohio State Veterinary Medical Association).

Diseases of the throat described in every text-book, and their frequent appearance in veterinary medicine, must necessarily make the practitioner more or less familiar with their characteristics and gradations, therefore it would be not only superfluous, but also improper to consume the time by recapitulating the symptoms, causes, etc., particularly as in many of the ordinary cases, therapeutic interference is not wanted.

Last fall we had many opportunities to observe the last named form, as at one time the disease threatened to become enzootic. The milder sore throat cases, which were in the majority, suffered mostly from catarrhal pharyngitis, "Angina Pharyngitis."

Among those affected with laryngo-pharyngitis were several which either took sick suddenly, or for which medical assistance was postponed, until suffocation threatened to cut short their existence, thus necessitating the operation of tracheotomy. For this purpose I prefer the trocer invented by Prof. Hayne, of Vienna, especially when the acuteness of the case indicates a probability that the tube will not be wanted any longer than a week or ten days, as in croup, purpura hemorrhagica, (Blutflecken krankheit), cramp of the larynx, etc. The technical procedure with this trocar requires the least time, there is no loss of substance, and the canulæ is not difficult to clean. The caliber, however, is too

small to allow such an animal to work. Prof. Vogel and Prof. Prosch are less favorably impressed by it; the former recommends Thompson's as the most suitable. Besides other objections, they claim there is danger in operating with the Hayne instrument, in that it is likely to pierce a jugular. I once thought to have met with such an accident, a short account of which may not be out of place.

One evening before sunset, summons reached me to come to see a dray horse, which just came in from work, whistling and roaring bad enough to suffocate, if not relieved soon. Provided with the instrument in question, I hurried to the place. Approaching the scene of trouble, I could distinctly hear the described noise, notwithstanding the crowd collected around the animal. Drawing nearer, I saw a well nourished black horse, very uneasy, with an anxious look, pumping flanks, and foaming from the mouth and nose. Under these circumstances I was obliged to operate without delay. I immediately grasped the trachea with the thumb, index and middle fingers of the left hand, about four inches below the larynx, pushing the sterno-maxillary muscles a trifle backwards from their lateral position, giving the tracheotome a passage free from all other tissues; the trachea was then pierced through, from left to right, in an exact transverse direction, with the instrument held in the right hand, so that the central opening in the tube remained in the middle of the windpipe. The stylet was then taken out, and the screws, (to make the canula stationary), adjusted, with allowance for some swelling. As the skin is the most sensitive tissue, it is advisable to first make an incision through the skin with a knife, before the trocar enters. Usually, upon withdrawing the stylet, air will follow, But alas! this time both openings discharged as much blood as their lumen would allow. The bystanders knew no better but than I was bleeding the horse, which they thought was well done; but my enthusiasm was easily controlled; the thought that the opposite jugular might have been struck appalled me; still I managed to keep calm, walked leisurely around to the other side of the horse, inspected the outlet of the tube, and

finding my supposition erroneous, I gained courage. At the same time the hemorrhage diminished and in one-half to three-quarters of a minute, ceased entirely, as did also the blowing and puffing. The canula was removed, the patient allowed to go to his stall, when he commenced eating hay.

During a fit of coughing he expelled some blood clots, mixed with slime; perhaps a false membrane. The owner informed me that on the same afternoon the horse had performed hard work, to which exertion I attributed the formation of a hæmatoma saccatum, which the instrument must have penetrated, producing the critical symptom alluded to above. Four days after he was at work again.

Now, if the more popular operation, with excision of a suitable piece of the trachea, is resorted to, the reconvalescence requires more time, and, as we all know, will not admit of a complete restoration, though it is seldom harmful. Should the nature of the case require an artificial opening for several weeks or longer, particularly if the animal is obliged to work, a tracheotomy tube of a later pattern, consisting of two parts, arranged and attached in such a manner as to attract but little attention, is preferable.

Circumstances may compel us to deviate from the custom in the selection of a tube. Tumefaction of the neck at the outset, or the development of the same around the artificial opening, occasionally requires a change of the tube, in which case the operator must use his own judgment.

Recently I was called upon to treat another horse, with roaring and difficult respiration. The driver told me that about two months previous the horse had a similiar attack of about thirty minutes duration, since which time he evinced nothing wrong until now. As there was no swelling detectable around the neck or maxillary region, but repeated convulsive coughing, sweating, and a frothy discharge from the nostrils, I presumed it must be "Spasmus Glottidis," an ailment known to me only through literature. Whether my diagnosis was correct or not, the symptoms indicated the operation, which was performed, giving relief to the horse and all interested. The Hayne trocar was again chosen, ex-

pecting the horse would not need it any longer than a few days.

Despite the original symptoms, and an amnestic report, indicating a spasmodic affection of the larynx, I was obliged on the following day to change my diagnosis to "Glottis œdema," owing to the phenomena which developed through the night. All went well until the eleventh day, when I plugged the openings of the tube, as I thought sufficiently long to produce wheezing if the air passages were not clear; removed the canula, cleaned it, etc., but in eight to ten minutes after he commenced roaring again. My expectations not being realized, I felt obliged to insert another tube, of a larger caliber, which served two weeks longer, when the horse seemed to be all right, with the exception of the healing of the wound; whilst this was going on the horse received daily exercise, without showing any deficiency. But we were destined to be disappointed, for in the first day's hard work, it was found that his respiration was not yet normal. The proposition to send him to pasture for a few months met with approval, from whence we receive most satisfactory reports.

The active participation taken by some of our most progressive surgeons, in the laryngeal operation, "laryngotomy," recorded in the AMERICAN VETERINARY REVIEW, leads us to believe that diseases of the throat are attracting more attention than heretofore.

Considering these facts, a translation of an article on "Spasmus Glottidis," by Prof. Anocker, in Koch's Encyclopedia der Thierheilkunde, will undoubtedly be appreciated. It reads as follows:

Spasm of the glottis, spasmus glottidis, consists in tonic contractions of the lateral crico-arytenoid, the inferior and superior thyro-arytenoid, and the transverse arytenoid muscles; secondly, also the muscles of the neck. As in asthma, the cause has been sought for in the reflex irritation of the nerves of the larynx, consequently the spasmodic attacks recur at uncertain intervals. As the glottis becomes contracted during glottis spasms, it produces a dyspnœ, attended

with loud sounds during inspiration, therefore it was enumerated as one of the causes of roaring, but Gunther, Senior, doubts this, as he did not see it set in upon intentionally irritating the upper laryngeal nerve. That such a spasm can be brought about is not to be questioned, at least sporadic cases in horses have been observed. The spasmodic attacks recur sometimes daily, even while the horse is at work. Connected with them are cough and suffocating spells, sometimes restlessness, anxiety, shivering, distended nostrils, rattling in the throat, stretching of the head, staring look, staggering movements and collapse. Characteristic is the sudden abatement of the attacks.

In the autopsy of a horse, Degive found a cyst as large as a hen's egg, filled with colloid matter, at the base of the epiglottis, which, on account of its position, could not close the glottis, but may have called forth reflex spasmodic contraction.

To obviate threatened asphyxia, tracheotomy must be performed. Repeated attacks of spasms must be alleviated by hot water inhalations, or by a solution of kali. bromide, as prescribed for asthma, and by tracheal injections of the same, or a solution of cocaine or morphia. Toxic symptoms which may take place will disappear at once upon inhaling several drops of nitrate of amyl.—(Anacker).

As to therapeutic treatment, I am not in possession of any specific remedy, with which this manifold complicated ailment can be checked or influenced much. In benign cases, the owner, with the aid of his infallible neighbor, will with few exceptions, help himself. The malignant or complicated cases must be treated according to circumstances. It would be difficult to give a formula which would hold good for even a few days. There is, however, a discovery made known, which is worth communicating to those who believe that nature tolerates support, when rendered in a judicious manner and at the proper time.

At a recent meeting of the German Naturalists and Physicians at Heidelberg, colleague Dr. Jelkmann, of the Section for Veterinary Medicine, reported on "Laryngo-

Pharyngitis of the Horse, and its Cure by Laryngeal Injections of Prussic Acid," wherein he says:

"Although the results in the treatment of inflammatory affection of the respiratory mucous membrane in coryza, adenitis equorum, scalma, etc., were very unsatisfactory, with the remedies employed so far, namely: to cut short the morbid process, fault must not be found with the physiological action only, but also in the mode of application. As these agents are introduced mainly through the mouth, it is impossible for them to come in direct contact with the affected mucosa, and thus a local influence is almost excluded."

Local methods of treatment promised much better results, as through the examinations of Prof. Dr. Schuetz it was proven that the diseases in question nearly always, in their primary stage, present a limited infectious inflammation of the surface of the mucous membrane. Again, the experiments of Prof. Dr. Dickerhoff have also shown that the local treatment of the respiratory mucosa is easily accomplished. Therefore, if the proper remedy be found, the result will be satisfactory if the local treatment be adopted in time.

Dr. Jelkmann being guided by the above views, made numerous experiments, and applied many expedients which were recommended, and others which had not yet been put to test.

The first opportunity presented itself in a large transfer stable at Frankfurt, M., among horses affected with infectious laryngo-pharyngitis, a scalma enzootic.

Among one hundred horses in an enclosure, some sixty took sick within six weeks, at intervals of one, two and four days. It being midsummer, those patients, six in number, which took sick in the first three days were isolated and placed in a large, roomy, well-ventilated hall.

The internal treatment with the remedies known as promoters and regulators of morbid slime secretion, etc., was carried out from the first to the seventh day, but seemed to have no visible effect, nor did the externally applied derivans.

In consequence, laryngeal injections were made as an ex-

periment. By this time the number of patients increased to twelve.

Laryngeal injections were administered to ten of these patients, each two receiving a different compound, for example: one consisted of solution of alum acetum, another of Lugol's solution, another contained cocaine hydrochloric, and so on. The remaining two of the twelve were entrusted to physiatrice.

This treatment was continued for four days without any apparent improvement, only in those having received the cocaine, it was noticeable that the coughing irritation grew less, soon after the injection, which, however, in a few hours recurred with the same violence. In those left without treatment the disease remained stationary.

Taking in consideration the satisfactory results attained in human medicine by applying anodynes to the suffering tissues, in inflammatory affection of the larynx and bronchial mucous membrane, an experiment was made with the following solution: consisting of morphia hydrochloric, 2.0; aq. amygdalar. amar., 200.0; ten grains of this solution was injected every morning and evening into the larynx of each of five other patients. The result was astonishing. The temperature, which was 39–8 to 40–7° Celseus, fell from the day of the first injection until the fifth, by which time the normal state was reached. The local appearances in the region of the œsophagus and mucous membrane of the larynx diminished in the same degree, the cough became loosened, less painful, the dysphagia disappeared and the appetite improved. The hyperplastic swellings of the maxillary glands also dissolved.

Of the twelve horses which took sick first and not treated after this manner, not one had recovered sufficiently to be able to perform the lightest work. While those which took sick eight to ten days later, and treated with aq. amygadar. amar. and morphia, were already at their usual work.

In the last two years Dr. Jelkmann treated all laryngeal affections in horses with positive and speedy success, as long as metastasis of the other organs did not set in.

If the local inflammatory process of the mucous membrane was in the early stage of development, the disease could be cut short within two to three days, indeed be entirely cured. If the disease had advanced further, a four to eight days' treatment with injections was necessary. It is remarkable that in two hundred patients the hyperplastic swellings of the submaxillary glands diminished after the first injections, and in but three cases, a slight imperfect abscess formed.

After these results there is no doubt that the prussic acid contained in bitter almond water with morphia, exercises a specific healing effect on the respiratory mucous membrane.

Prof. Binz's established non-fermentative and anti-putrefactive qualities of prussic acid supports such an opinion.

In the diseases in question, laryngeal injections are most effective. The head is lifted and stretched forward and the needle inserted in the so-called thyroid cartilage space, the contents of the syringe then being emptied under strong pressure. This pressure is absolutely necessary to the favorable result of the injection, for the diseased surface of the mucous membrane should not only be wet, but at the same time washed off; this washing off cannot be accomplished by the gentle inpouring of the fluid into the larynx.

Unfavorable manifestations have never been noticed to follow upon injections being thus carried out. If it is inconvenient to inject twice per day, one injection of twenty grains will suffice. When the weather is cold, it is advisable to warm the fluid before injecting.

"Abscesses, that may form after the injection, will heal readily, when lanced in time, and cautious antiseptic treatment is pursued."*—(Koenig).

HYPOSULPHITE OF SODA.

By E. H. Shephard, V.S.

(A Paper read before the Ohio State Veterinary Medical Association, Cleveland)

For some time I have been impressed by the fact that we have an agent classed among our veterinary remedies whose

*Vol. 16, p. 375, Archiv der Wissenschaftliche und Praktische Thierheilkunde.

virtues are not appreciated as perhaps they should be. And also that some simple remedies prove to be a power in the hands of some, while with others they seem to possess no curative virtues at all. It is undoubtedly a fact that the actions of many drugs are modified, not only by different organism, but by different climates and different surroundings, and especially when combined with other agents.

It is my endeavor to-day to bring before you, and, if possible, impress upon your minds some, at least, of the virtues I have found to be possessed by this cheap and efficient remedy, namely, the hyposulphite of soda.

This preparation is formed by boiling the filtered solution of sulphite of soda with sulphur, and after filtration and concentration the crystals are deposited in colorless transparent prisms or plates. It is odorless, and has a cooling and somewhat bitter taste, is neutral or faintly alkaline in reaction, and is soluble in 1.5 parts of water. Its main action is as an antiseptic, but it is also a strong deodorizer, alterative and insecticede. In the stomach it gives off sulphurous acid, which preparation it closely resembles. It destroys bacteria septic-germs, arrests fermentations and removes offensive smells. It is much used in photography, and forms an important part in some officinal tests.

Among the first cases in which I used this salt with marked success was in the treatment of a valuable stallion but recently brought from Calfornia, and not yet acclimated. Soon after arriving, many parts of the body, especially those covered by the harness, became covered by eruptions, and by their intense itching caused the animal to rub and produce a raw surface, and he could with difficulty be prevented from irritating it still more. A peculiar black discharge issued from the anus continually and trickled down the thighs and so on to the ground; his tail had become full of it and seemed from its tarry consistency to defy thorough cleansing. A peculiarly bad odor accompanied the discharges, and his appetite was capricious. His food and surroundings were of the cleanest and best, and the general attention bestowed upon him was befitting a $10,000 stallion.

After thorough examination I put him on hyposulphite of soda, ʒss doses, three times a day, with a very small quantity of gentian, eighteen powders, six days' treatment, sufficient to cleanse and cool his blood, entirely allaying the skin irritation and regulate the bowel secretions to almost perfection. In one year from that time he had a slight similar discharge from the bowels, which was entirely overcome by one-half dozen powders of the same preparation.

During the past summer I have treated skin trouble, whether dependent upon constitutional or local causes, almost entirely with this preparation of soda and with universal good success. One case deserves mention especially. A young pacing horse with considerable speed had been fed pretty high to fit him for a good showing at the fall sales at which he was entered. Unfortunately, without much regular exercise he was given a long drive on a hot day, and the next morning I was called and found him one mass of pimples from the tips of his ears to his hoofs. In a few days he was as hairless as a Mexican dog, the skin scaling off and leaving an irritable itchy surface which he rubbed and bit, and actually tore with his teeth at every opportunity. Solutions of hyposulphite were applied externally, and following a physic ʒi doses four times a day given internally. Other preparations were used for a day at a time externally, but none seemed to allay the irritation as well as the soda. With a cooling diet and an occasional stimulant for the kidneys, thirty days found him again on the road in fair flesh, good spirits and covered with a thick, glossy coat. Other cases of eruptions of less consequence, some affecting the larger part of the body, others only local, have been successfully combatted, and the animal kept at his work.

In speaking of this medicine, Finlay Dun in his excellent work gives several interesting experiments, showing its power as a poison to fungi and other low organic forms, and many have been made, mostly as recorded with the sulphite, showing its power to control septic conditions.

Dogs previously prepared for several days with small doses of hyposulphite have withstood injections of fetid pus,

and even survived the injection of the purulent discharge from a glandered horse. It is in the treatment of septicæmia and all putrid condition of the system that I think this agent deserves a thorough trial.

About one year ago I was called to see a promising colt, the right side of whose face was terribly swollen, and from eight or ten openings issued a fetid, putrid discharge somewhat dark in color and mixed with streaks of blood. The skin seemed to a large extent to be under run, and I had to open several pockets to get a drainage. There were several openings into the mouth, and the animal could scarcely eat soft food, while on his back, just forward of the hip on the right side, was a large swelling discharging from its one opening a fluid identical to all appearance with the other.

The pulse was 82 and wiry temperature 104½° F. Y. I concluded that here we had a serious case but could not give the direct cause unless it originated with the teeth, which were quite sharp opposite the internal openings, I dressed the teeth and thoroughly cleansed the abscess, using a bichloride solution 1-5,000, and left a solution for future injection of 1-5,000. I administered ʒ i of hyposulphite of soda and left instructions that he should get ʒ ss every four hours in solution. I saw my patient again in two days: pulse 60 temperature 103°, eating more and feeling apparently better. The abscesses showed a more healthy discharge and not inclined to spread, I continued the medicine for some days, reducing it in quantity, and my patient made a rapid recovery. I want to here state that the owner of the colt is one of the leading physicians of Cleveland, and he took occasion soon after to call my attention more particularly to this remedy, which was entirely new to him.

Two weeks ago I had a long talk with him again and he was very enthusiastic over his success with it, saying, "It has worked like a charm in every case." And he proceeded to call my attention to numerous cures he had effected with it, one or two of which are particularly worthy of mention.

From a scratch or small injury a young man's hand and arm had become swollen almost out of resemblance to its

original shape, the line of lymphatics to the shoulder were terribly enlarged, and the hand and lower arm had assumed a leaden hue which, with the constitutional symptoms, indicated the probability that amputation might soon be necessary to save his life. However, it was resolved to use the hyposulphite, and note its effect if any. Gr. xv were administered every four hours and by the following day a preceptible change for the better could be seen, and on the second day considerable hope was given that the arm could be saved. The fourth found him to all appearances out of danger and he rapidly made a complete recovery.

Another, still more serious, was the case of a man whose foot had been crushed down at the instep by the wheel of a heavy wagon and in hopes of saving it amputation had been delayed until almost before they realized the fact, it had become putrid. The limb was terribly swollen and pressure upon it, even as high as the thigh, would cause a fetid discharge to issue from the opening below. And after amputating just above the ankle, two large pus cavities were tapped above the knee and three below, to get sufficient drainage for the purulent matter that was fast accumulating. Every one who saw it thought there was little chance for the remainder of the leg or the patient's life, as he was much wasted and very weak. However, my friend, who was called in consultation, persuaded them to rely on the soda, which they did with very gratifying results, saving the patient's life and the remainder of the leg.

In numerous cases of wounds large and small where there was much discharge I have used this agent, and cannot compute the good it has done me. In the results of a runaway accident one horse had a wagon-tongue thrust into his neck just beneath the third cervical, passing through to the skin of the opposite side and in his efforts to escape, muscles, trachea, œsophagus, arteries and veins were stripped of their attachments and hung dangling like so many sections of slack rope; one wing of the atlas was fractured and a large pocket opened below along the lower surface of the vertebræ and behind the inferior cervical muscles. The depression of the head parti-

ally drained the several large pockets, and this case was treated successfully in a short time by local applications of bichloride and white solution, and the hyposulphite internally, there being scarcely any fetor at any time. I could call your attention to other cases just as gratifying to me, but I wish to name another condition for which I have found my subject beneficial.

In the treatment of gastric and bowel troubles associated with fermentations, we find different gases generated in various proportions, according to the cause, time elasped, and surrounding conditions. In cases apparently similiar I have found it necessary to use entirely different agents to gain my desired result. In the use of the hyposulphite for these conditions, I believe it to be an essential adjunct in every case. Associated with the process of fermentation and the formation of gases, there is always absorption to a greater or less extent of these poisonous products into the blood, and in many cases this is the sole cause of death. In the hyposulphite we have one of the greatest antiseptics and blood purifiers, thus acting at the same time to prevent absorption, to destroy the already absorbed, while striking directly ot the cause, it is very effective in arresting the fermentation. And again, in azoturia, although my experience is here limited, I am becoming more and more convinced that it is most worthy of a thorough trial. Undoubtedly, the whold line of symptoms in this disease is caused by the action of poisonous products upon ths nerves and their centers; thus, directly through the condition of the blood, we are sure to get our several results.

Urea is one of the natural constituents of urine, excreted from the blood by the kidney. In this disease, immense quantities of it are excreted, showing an unnatural action of the blood, which from its nitrogenous character, is without doubt. The hyposulphite of soda acts directly to diminish urea, and increase uric acid, the sulphates, sugar, and other non-nitrogenous constituents, a condition certainly necessary to the recovery of the patient. I have used it in several cases, all of which have recovered. Two of the number were pros-

trated and could not rise, and one that was placed in slings could not bear any weight on one hind leg for five days, and although standing, his urine had to be drawn during the first three days.

Considering the scarcity of my patients that have lived after being prostrated with azoturia, and subject to my previous treatment, I feel that my new departure deserves further trial, which I shall certainly give it at my first opportunity.

I wish once more to trespass upon your patience by drawing again from my memorandum of experience. Two cases of abortion, the first occurring about one week ago before I was called. Was informed the animal appeared well for two or three days, then began to be uneasy, ate little, and gradually grew worse until at the present she ate nothing, and was continually uneasy. Respiration 36; pulse 80; temperature 105°. A fetid discharge issued from the vulva, and the abdomen had a tucked-up appearance, while she strained at short intervals, passing a colored discharge. I found the vignia and uteras much swollen, the latter containing a small quantity of putrid matter. I cleansed the parts as thoroughly as I could, although the effort caused much irritation, and being a little afraid to risk the hyposulphite alone I combined with it fair sized doses of aconite; and, after two or three days of uncertainty she began to make a slow recovery, which proved permanent. The other, not as serious as I would have liked, I was called to attend within an hour after the untimely delivery. Found her not much changed from the normal in pulse, and temperature, inclined to eat, yet a little uneasy; and to all appearance the abortion was a complete one. Gave her a light opiate, and waited developments. The next day she was more uneasy, lying down considerably, eating little; respiration 24; pulse 72; temperature 104½°; and quite a propuse discharge from the vulvas. I attended to her general comfort, more especially left instructions in regard to diet; administered ℥ 1 of hyposulphite in solution, and left similar doses to be given every four hours. The next day respiration 16; pulse 36; temperature 100°. Complete recovery followed.

In conclusion, my experience with this agent has been highly satisfactory to me, and I could name many more cases where I attribute the sole cause of recovery to it. Let me urge all who have not given it a thorough trial to do so, and from those to whom it is familiar I should be pleased to hear the results of their experience.

EXTRACTS FROM FOREIGN JOURNALS.

PELVIC HERNIA—CONSTIPATION—ABNORMAL POSITION ASSUMED BY THE PATIENT—DIAGNOSTIC VALUE OF THIS SYMPTOM.

By Mr. T. Brissot.

Referring to the fact that it is not uncommon to see horses suffering with colics assume the dog-sitting position, the author describes the case of a mare which he was called upon to treat. When first seen, she was resting on her knees, with her head extended and resting on the ground, and her hind quarters elevated; in fact, in the position of a cow in the first part of the movement of rising. When made to rise to her feet she showed a strong desire to resume the former position, and did so, in fact, twice in less than ten minutes. There was an evident indication of pelvic pain. Upon rectal examination it was found that the pelvic curvature of the colon was hard and distended, and was engaged in the pelvis, occupying the place of the bladder, to such an extent that at first neoplasm of the vesical organ, or of the floor of the pelvis was suspected. But this supposition was corrected by an exploration of the vagina, and catheterism of the bladder. The intestines were filled with a hard mass and could not be pushed back to their position. It was a true pelvic hernia. The rectum was full of hard, dry balls of manure. The case proved to be one of constipation, and was relieved by rectal injections of sulphate of soda and a purgative.—*Rec. de Med. Vet.*

PERFORATION OF THE VAGINA IN A COW DURING COPULATION.

By N. Beisswaenger.

This accident, which is usually a rare one in this species of animal, is recorded on account of the comparatively slight relative lesion by which it was accompanied. A young cow, in good condition, was covered by a strong and vigorous bull, which performed the act with excessive impetuosity. Immediately after copulation a copious stream of blood escaped through the vulva, and the cow died before the arrival of the author. At the post mortem a laceration was found, on the right wall of the vagina, about two inches in length, and situated within a short distance of the opening of the vulva.—*Repert der Thierh.*

PERITONEAL TUMOR IN A HORSE.

By Mr. Aulage.

In this case the patient, an old horse, twenty-seven years of age, had within the past six months suffered on several occasions with attacks of colic, which were, however, generally relieved by cathartics. On this occasion the symptoms were not, at first, alarming. When first seen, the pulse was found normal, the artery somewhat full, the mucous menbranes were not ingested, the ears were warm, the loins flexible, there was some borborygmus in the large colon, the abdominal pain was not violent. The symptoms were relieved by a resort to simple treatment, but reappeared in a much aggravated form on the day following. The animal was then constantly lying down and rising up, the abdomen was retracted, the head was frequently turned backwards, on the right and left sides alternately, with the gaze directed to the flanks; the borborygmus had subsided, the loins were stiff, and the pulse was small and accelerated. Rectal exploration seemed very painful, though the organ was empty. Notwithstanding an active treatment, the case ended fatally after thirty-three hours duration. The post-mortem revealed the existence of a volvulus of the posterior part of the small intestine, which on closer examination proved to be a complete strangulation,

produced by a tumor in the lumbar region, of the size of a hen's egg, suspended by a thin peduncle, about eight inches in length.—*Rec. de Med. Vet.*

FRACTURES OF THE OS CALCIS; RESULT OF MUSCULAR EFFORTS.

By Mr. Detroye.

The following observations derive their principal interest from the manner in which the lesions to which they refer occurred. A bull fifteen months old in attempting to cover a cow had raised himself about on a level with her croup, when a sudden noise like that of the breaking of a dry piece of wood was heard, and the animal fell down on his hind quarters. When he got upon his feet he walked on three legs, dragging the right leg, the anterior face of the foot resting on the ground. The next day the hock was slightly swollen, and the point of it less prominent. The tibio-calcanean triangular space had disappeared, the crepitation was well marked, and there was an oblique fracture of the os calcis, in the middle of the bone. A splint was made with a piece of sheet iron, made in the form of a trough or gutter, in order to adapt itself to the anterior face of the leg and of the hock, and secured by four leather straps, two above and two below the hock, and extending, therefore, from the middle of the tibia to the middle of the cannon bone. This was well padded, and so adjusted to the leg as to keep it in perfect extension. After three weeks the animal beeame restless, and displaced the splint, and when it was removed the foot rested flat on the ground, the hock had resumed its normal shape, with scarcely any malformation, and the patient stood upon his leg. In a few weeks the recovery was complete, and the lameness had subsided, notwithstanding the presence of the callus that remained.

2d. An old horse while lying down made a sudden effort to rise. At that moment his right hind leg slipped backwards, and to avoid a fall, another effort was made, which failed, and the animal fell, unable to rise. A fracture of the os calcis near its articulation with the astragalus was readily recognized; and the animal was destroyed.

3d. A young calf was found to be very lame, in consequence of falling into a large excavation, the hock being painful and much enlarged. Upon being slaughtered, the os calcis was found to be fractured, obliquely, about an inch below its summit, with a laceration at that point, of the tendon of the perforatus muscle. The fracture took place at about the union of the two nuclei of ossification of the bone.—*Ibid.*

SPRINGHALT AND METATARSAL TENOTOMY.

By M. L. SERGENT.

As a point in the statistical argument in favor of this mode of treatment of the disease in question, the author, following the directions recommended by Bocca, Brogniez, Delwart, Palat and Degive, reports that he has performed the division of the tendon of the lateral extensors of phalanges upon fourteen horses suffering with springhalt in various degrees, and has obtained the following results: Nine recovered completely; four showed a very satisfactory improvement, almost a recovery; and one was slightly improved. Metatarsal tenotomy is a perfectly simple and harmless operation, and offers sufficient chances of success to encourage its performance, and justify its adoption into the domain of common practice by the guild of qualified veterinarians.—*Ibid.*

COLLEGE COMMENCEMENTS.

CHICAGO VETERINARY COLLEGE.

The close of the eighth session of this institution took place on the 24th of March at Hooley's Theatre before a large audience of the friends of the College and of its Alumni Association. The degree of D.V.S. was conferred by Prof. R. J. Withers upon the following gentlemen:

Allen, J. M.....New Richmond, Wis.
Archibald, R. A.....Morrison, Ill.
Annand James G.....Lake City, Minn.
Arpke, A. H.....Franklin, Wis.
Bagnall, Wm. P.....Millbrook, Pa.
Barnett, J. A.....Edwardsville, Ill.
Barnett, Otis.....Edwardsville, Ill.
Berner, J. S.....Minneapolis, Minn.
Bone, J. L.....Bethany, Ill.

Borum, S. D.....Winchester, Ill.
Bristow, Geo. E.....DeKalb. Ill.
Cain, Geo. E.....Lynn, Mass.
Cann, C.....Elizabethtown. Ky.
Chaffee, F. K.....Lee, Mass.
Chandler, T. W.....Chicago, Ill.
Ditewig, Geo.....Camp Grove. Ill.
Donaldson, R. H.....Fairmount, Minn.
Drummond, R. H.....Elmdale. Kas.
Dyson, O. E.....Rushville, Ill.
Eells, F. C.....Ottawa, Ill.
Eisenhoever, A. L.....Abilene, Ill.
Fickert, A., Jr.....Theresa, Wis.
Finley, R. W.....Manitowac, Wis.
Fisher, H. S.....Chicago, Ill.
Fitch, D. N.....La Porte, Ind.
Fitch, Schuyler.....Huntertown, Ind.
Folts, D. A.....Auburn, Wis.
Fox, D. F.....Peru, Ind.
French, A. H.....Aberdeen, Miss.
Gansel, B. E.....Chicago, Ill.
Gwinn, E. E.....Oakland, Ill.
Hanna, A. R.....Peoria, Ill.
Harrington, Wm. B.....Paw Paw. Ill.
Hawley, H. W.....Beloit, Wis.
Heer, R. S.....Galena, Ill.
Hinkley, E. R.....Norwalk, Ohio.
Hoover, L.....Richmond, Ind.
Johnson, H. J.....Milwaukee, Wis.
Judson, F. E.....Polo, Ill.
Kelso, J. R.....Milwaukee, Wis.
Kerr, C. C.....Chicago. Ill.
Kinsey, G. W.....Lansing, Mich.
Kinyon, B. F.....Sharon, Wis.
Knight, W. A.....North Topeka, Kan.
James, Gus.....LeClaire, Ia.
Laws, J. P.....Westfield. Ill.
Leech, Geo. E.....Delavan, Wis.
Lennon, F. J.....Joliet, Ill.
Mabie, Wm. A.....Warsaw, Ind.
Malone, Jas.....Henry, Ill.
McNair.....Kaneville, Ill.
Miller, Fred.....Portland, Ind.
Molenhoff, R. H.....Mattoon. Ill.
Mohney, C. E.....Vicksburg, Mich.
Montgomery, C. C.....Middletown, Ill.
Noble, Geo. E.....Nashua, Ia.
Quitman, E. C.....Chicago, Ill.
Richardson, W. J.....Harvard. Ill.
Risbel, E. H.....Vicksburg, Mich.
Robinson, W. F.....Caldwell, Kan.
Rush, E. G.....Girard, Ohio.
Ryan, J. H.....Sycamore. Ill.
Salusbury, H. H.....Summit, Miss.
Schaefer, V.....Oakland, Neb.
Scott, C. E.....Jacksonville, Ill.
Seago, O. A.....Jerseyville, Ill.
Seaman, Wm. A.....Marengo, Ill.
Sherwood, A. E.....Sheldon, Ia.
Shipley, L. N.....Sheldon, Ia.

Siegrosser, J. L.....Chicago, Ill.
Smith, C. P.....La Prairie, Ill.
Spencer, Hume F.....San Jose, Cal.
Stull, C. M.....South Bend, Ind.
Tyler, J. L.....Onarga, Ill.
Watson, John G.....Humbolt, Ill.
Williams, Charles.....Northwood, Ia.
Wilmington, J. A.....Lake Villa, Ill.
Yeager, F. D.....Lena, Ill.

MONTREAL VETERINARY COLLEGE.

Department of McGill University.

The convocation of the Faculty of Comparative Medicine and Veterinary Science of McGill University was held in the William Molson Hall. There were quite a number in the hall, though not nearly so many as it will hold, at the big convocation to-day. In the centre of the hall were the students of the various years, and on either side a number of ladies and other friends who had assembled to see the graduation exercises.

Prompt at three o'clock Mr. J. W. Brakenridge, B.C.L., registrar of the university, entered at the head of a procession including the Chancellor, Sir Donald A. Smith; the Vice-Chancellor, Sir William Dawson; Dr. D. McEachran, Dean of the Faculty of Comparative Medicine and Veterinary Science; the professors of the Faculty and the members of the convocation and the graduating class.

The Chancellor having taken his seat, the proceedings were opened. Among those who occupied seats on the platform were Dr. Stewart, of the Medical Faculty; Mr. J. J. Curran, Q.C., M.P., and Mr. John W. Gadsden, M.R.C.V.S., of Philadelphia, whose valuable donation of a collection of books, pathological and anatomical specimens, has already been noticed.

The Chancellor called upon Professor McEachran, Dean of the Faculty, who delivered a very short but pithy address.

He then read the list of prize winners, who were then called up and presented with their prizes by Sir William Dawson, assisted by Professor Charles McEachran. The list is as follows:

Veterinary medicine and surgery, George E. Macaulay;

anatomy, Thomas E. Simpson; diseases of cattle, D. B. Comstock; chemistry, J. D. MacIntyre; physiology, J. D. MacIntyre; histology, Wilfred Plaskett; materia medica, J. D. MacIntyre; botany, W. Plaskett; zoology, M. C. Wylie; the best examination in all subjects (silver medal), Sidney S. Twombly; second prize for the same, John A. McCrank.

Extra prizes—For the best essay read before the Veterinary Medical Association:—1, Sidney S. Twombly, $10; 2, David St. Louis, $8; 3, J. A. McCrank, $7.

For the best essay read before the Society for the Study of Comparative Psychology (book)—J. A. McCrank.

The following gentlemen were then called up, and, having taken the customary oath, the degree of D.V.S. was conferred upon them by Sir William Dawson, Mr. Brakenridge presenting the diplomas:

Sidney S. Twombly, John A. McCrank, David St. Louis, Thomas B. McDonald, Thomas C. Simpson, John Watson, George E Macaulay, A. W. Gorham, Donald B. McDonald, Charles M. Higginson, David B. Comstock, George Townsend and George A. Miller.

The following gentlemen were awarded the degree as graduates of the late Montreal Veterinary College, who have been found to have complied with the regulations governing the granting of the degree to such:—

Paul Paquin, bacteriologist and professor of veterinary science, Agricultural College, Columbia, Mo.; A. R. Rowat, chief veterinarian to the government of Honolulu, S. I.; Peter Cummings, lecturer of anatomy, Quebec Veterinary College; John Robertson, veterinary surgeon, Second United States Cavalry; John Ryan, lecturer Chicago Veterinary College, Chicago, Ill.; Charles R. Simpson, Charlestown, Mass.; James B. Paige, lecturer on veterinary medicine, Amherst Agricultural College, Amherst, Mass: Archibald A. Keys, Minneapolis, Minn.; and Edward C. Crevier, Peterborough, Ontario.

Dr. McCrank was then called upon and delivered the valedictory address. Sir Donald Smith then referred in terms of high praise to Dr. Gadsden, for his munificent present to the Faculty, and called on that gentleman to speak.

Dr. J. W. Gadsden, M.R.C.V.S., said: I have had excel-

lent opportunities for six years past of knowing the nature of the work being done by the Montreal Veterinary College, having for that time occupied the position of one of the examiners in the practice of medicine and surgery. I may say that I have watched its progress with interest, and year by year noted the improvement in the proficiency of the young men coming before us. Besides, I am thoroughly aware of the high reputation of the school, and the gentlemen who form its staff of professors and associate professors. And I know how much the Dean of the Faculty has had to do in preventing contagious diseases in your live stock, in the advantage of Canada over the United States of from $10 to $15 a head for every animal exported to Great Britain.

I wish here to say, that I have noticed with considerable surprise, the fact stated by the Dean, that this Faculty, second in importance, both commercially and scientifically, to no other Faculty in the university, should receive no aid to enable it to carry on its good work. Surely in this great commercial metropolis, there are gentlemen who can appreciate the great work this Faculty is engaged in, sufficiently to induce them to contribute to its endowment. As an inducement for others to do something towards helping on the progress of comparative medicine, I beg to say that I have spent thirty-three years of my life in the active practice of the profession, during which time I have accumulated a library and private musuem of considerable value. The library contains among other works, "The Veterinarian" for fifty years, a most important period in the history of our profession, and especially on the subject of contagious diseases of domesticated animals in Great Britain, and the legislation bearing on this important subject. As I am now about retiring from practice, I have much pleasure in presenting both to this Faculty, the only condition I ask being that they be kept intact, and form a part of the library and museum of this Faculty. In conclusion, I beg to express a hope that before long this Faculty will have among the benefactors of the university, friends enough to put it on a footing, if not equal to the older Faculties, at least such as will enable it to keep pace with them on the onward march of improvement. I may say that the class who have gradu-

ated this season, are equal, if not superior, to any class I have previously examined, and I have no hesitation in saying that they will uphold in every way the reputation of Canada's great seat of learning.

Dr. M. C. Baker delivered a valuable farewell address to the students, giving a retrospect of their past studies, and a very appreciative account of the work before them. His address contained some excellent advice. Among other things he counselled them to remember that they could not live for themselves alone, and to make total abstinence their motto.

The Chancellor, Dr. Curran, delivered a long and interesting address to the class, and the exercises were brought to a close in the usual manner.

NEW YORK COLLEGE OF VETERINARY SURGEONS.

At the last commencement exercises of this institution, the following gentlemen received their diplomas of veterinary surgeons:

Tritton, R. Lindsay	Boonton, N. J.
Deal, John D.	Charleston, Mo.
Haley, James, Jr.	Hamilton, Scotland.
Browning, Pleasant H.	Virden, Ill.
McDougall, Robert P.	Wilmington, N. C.
Plummer, Edward, Jr., M.D.	Baltimore, Md.
Strong, Wesley F.	Washington, D. C.
Chambers, Edgar.	New York City.
Ferster, James H.	" "
Hassloch, August C	" "
Manney, Robert N.	" "
McNair, Robert J.	" "
Caulfield, Charles E.	" "
Mullen, James H.	" "
Lawler, James H.	" "
Brooks, William H.	Brooklyn, N. Y.
Curran, John J	" "
Meinck, Louis J.	" "
Moadinger, Charles F., Jr.	" "
Anderson, Charles E.	City Island, N. Y.
Smith, D. Edgar	Manhasset, N. Y.
Shearer, James B.	Pittsford, N. Y.
Doyle, William J	Auburn, N. Y.
Childs, Thomas S.	Troy, N. Y.
Stinson William	Chelsea, Mass.
Henderson, Edwin P.	" "
Moore, Charles S.	Plainville, Mass.
Miller, Monroe B.	Old Line, Pa.
Miller, Harry K.	Mannheim, Pa.
Collom, William B.	Doylestown, Pa.
Massinger, E. Michener	Chalfont, Pa.

Downs, Morris M.....West Chester, Pa.
Fox, Robert J.....Bryn Mawr, Pa.
Christy, Henry S.....Philadelphia, Pa.
Albright, Harry F.....Allentown, Pa.
Young, Edward J.....Media, Pa.

SOCIETY MEETINGS.

ILLINOIS STATE VETERINARY MEDICAL ASSOCIATION.

The Illinois State Veterinary Medical Association held its regular semi-annual meeting February 25th at the Windsor Hotel, Bloomington. The meeting was called at 10 A.M. by President Baker, of Chicago, and ten members responded to roll call.

The following members were present during the session: Drs. Jas. Addison, S. S. Baker, J. W. Harwood, C. E. Hollingsworth, J. F. Ryan, C. E. Sayre, Jno. Scott, R. J. Withers, W. L. Williams, Jno. McClintock, Jos. T. Nattress, J. F. Pease, H. Thomson, A. G. Alverson, N. I. Stringer, M. Wilson and G. L. Crocker (new member).

Several members-elect were present, but did not qualify.

The minutes of the previous meeting being read and approved, correspondence was read from Prof. McIntosh, regretting absence, and from Drs. Walker and Schoenleber, regretting absence and sending essays.

The Corresponding Secretary also reported correspondence with the Secretary of the National Association in regard to its next annual meeting.

The Treasurer's report was then read, showing a balance of $31.95 in the treasury.

The committee on reprinting the constitution and by-laws was called on to report. The chairman being absent, Dr. Pease reported that the reprints could be obtained for $15.00 per hundred.

Dr. Baker and others reported better figures. On motion by Williams seconded by Hollingsworth, the subject was deferred until later.

The following gentleman's names were then proposed for membership: Drs. T. J. Gunning (Chic. '90), Neponset; Jno. Miller (Montreal '88), DeKalb; J. W. Parkinson (Chicago '90), El Paso, and N. P. Whitmore (Chicago '90), Gardner.

On motion by Dr. Williams, seconded by Dr. Withers, they were unanimously elected by acclamation.

On motion by Dr. Williams, seconded by Dr. Hollingsworth, the order of business was suspended and a committee appointed to revise the constitution and by-laws, and report at this meeting. The Chair appointed Drs. Williams, Withers and Hollingsworth.

The following bills were then read: For stationary, Recording Secretary, $1.00; express on reprints, $1.35; programmes, envelopes and postage, $7.00. On motion by Dr. Hollingsworth, seconded by Dr. Withers, they were ordered paid.

Dr. Hollingsworth presented a bill of $10.00 for stationery and postage during his term of office as Corresponding Secretary. On motion by Dr. Ryan, seconded by Dr. Withers, it was ordered paid.

Dr. Wilson, of Mendota, presented a paper on "Diseased Meats." *

DISCUSSION.

Dr. Withers favored the thorough inspection of all meat animals before and after slaughter. Also the thorough inspection of milk and milk dairies. He favors the spaying of cows used for dairy purposes, as thereby the influence that æstrum has upon the quality of the milk is avoided.

Dr. Williams favors strict inspection in the interests of the consumer and not of the producer. Cooking meats and boiling milk will destroy most micro-organisms, but where the chief damage is done by ptomaines or poisons secreted by the microbes, this is not destroyed by cooking. Where these exist, the meat or milk should be condemned.

Dr. Ryan described the method of inspection used by the Jewish officials, and commended it as very thorough and highly satisfactory.

In answer to a question, Dr. Scott reported that no work was being done at Peoria to check the spread, etc., of actinomycosis.

The essayist spoke of a recent decision in Scotland regarding bovine tuberculosis. All of the carcass of an animal so diseased is condemned for use.

Dr. Thomson, of Paxton, then read a paper on "Fractures." *

DISCUSSION.

Ques.—"Do you always put such cases in slings?"

Ans.—"Yes."

Dr. Williams: I sling some and some I do not. With colts, I prefer to bandage in plaster and turn them out.

Dr Scott: "How do they get up and down?"

Dr. Williams: "They soon learn to manage the stiffened limb."

Dr. Nattress: "How do you put bandages on to stay above the hock?"

Dr. Williams: "Wrap with batting, then with dry muslin bandages; then stiffen the broken parts with sole leather splints well soaked in hot water, and cover with freshly wetted plaster bandages."

Adjourned for dinner.

The society re-convened at 2 P.M. and renewed the discussion.

Dr. Withers uses slings as seldom as possible.

Dr. McClintock mentioned a case of fractured humerus that was put in slings, and made a good recovery.

Dr. Scott has had several cases of fracture of the *os conoræ*, and has used plaster casts, and put in the slings, and had good results.

Dr. Withers has used the plaster casts alone in these cases, and had good recovery.

On motion the discussion was closed.

On motion by Dr. Pease, seconded by Dr. Ryan, the order of business was suspended, to receive the names of applicants for membership.

Dr. G. Z. Barnes, (Ames. '87), of Pekin, and Dr. G. L. Croker, (Chicago '90) of Springfield, were then proposed.

On motion by Dr. Ryan, seconded by Dr. Sayre, they were elected by acclamation.

Dr. Pease then read a paper on "Malaria in Horses."*

*To be printed in June issue.

DISCUSSION.

Drs. Williams and Withers being absent on committee work, this paper was spared mutilation. Dr. Sayre mentioned a case which he could attribute to no other cause but malaria.

Dr. S. S. Baker inquired if the essayist considered two drachms of quinine a "large" dose.

ANSWER.—"It proved large enough in these cases, which were all quite small or young animals. To a large horse I would give half an ounce, and if this, repeated, did not produce the desired effect, would increase,—if necessary, to an ounce."

The Secretary then read the paper of Dr. Walker, as the author was not present.

Dr. Baker invited discussion, as he had seen the case. The general concession was that it was a pelvic abscess. The question arose as to the possibility of an abscess being formed from a previous trocar puncture in the flank, and the pus gravitating downwards and backwards into the pelvic connective tissue. The opinion was general that it could not have been so formed.

Dr. Schœnleber sent in his paper on the subject of "Our College Work too limited." It was not discussed.

Dr. Sayre then read his essay on the subject of "Veterinary Dentistry."*

DISCUSSION.

Dr. Williams drew attention to the fact that caries does not start on the table surface as a rule. The hollow spaces in the ends of the teeth of old horses, are due to entire wearing out of the enamel at that place. Malformations occur in which there is no dentine formed between two layers of enamel in the molars. This causes splitting of the teeth, and caries starts from this cause.

Dr. Hollingworth, 'Do the incisors ever get too long?"

ANSWER. Sometimes, and especially after much trimming of the molars, the latter do not touch without too much lateral motion of the jaws. When the mouth is in a state of repose, the molars do not touch together, in the normal condition."

Dr. Thompson asked the cause of chisel-shaped teeth.

ANSWER. There is too much difference in the set of the molars in the two jaws. The obliquity of the table surfaces increase until lateral motion is retarded and then prevented. The teeth being cut off until lateral motion is possible, they improve in shape for a while, but the deformity remains, and the teeth tend to get into the same shape again. I have seen cases where this occurred on one side from partial paralysis of some of the muscles of mastication, the jaw being drawn to one side."

The committee on constitution and by-laws reported by their chairman, Dr. Williams. He read the amendmendts proposed, and moved that they receive the sanction of the Association and be laid over to the next meeting for adoption. Seconded by Dr. Withers.

After some discussion it was decided, on motion by Dr. Ryan, seconded by Dr. Scott, to amend the proposed amendment to the by-laws, by adding a clause

*To be printed in June issue.

to the code of ethics, prohibiting the offering of gratuitous advice and receipts through the veterinary columns of agricultural and other non-professional journals.

The original amendments as amended, were then given the unanimous sanction of the Association, and will be acted on finally at the November meeting.

In order that the members of the Association might become familiar with the proposed amendments before the November meeting, it was moved by Dr. Williams seconded by Dr. Withers, to have the constitutions and by-laws, as altered by the proposed amendments, printed in pamphlet form for distribution to all members of the Association.

It was suggested that a list of the officers of the Association, from its organization to the present time, be included in this reprint, together with the roll of membership.

Dr. Williams included this in his motion, approved by his second. The motion was carried and the matter of reprinting referred to the committee appointed at the last meeting for that purpose.

Thanks for the use of the hotel parlors were voted the proprietors of the house, and Dr. Williams was appointed to convey them.

The Association adjourned to meet in Chicago, in November.

J. F. Pease, D.V.S.
Recording Secretary.

MASSACHUSETTS VETERINARY ASSOCIATION.

The regular meeting of the Massachusetts Veterinary Association was held at 19 Boylston Place, Boston, Wednesday evening, Mar. 25, 1891, President Thomas Blackwood in the chair.

Members present: Drs. Blackwood, Bunker, Emerson, Hadcock, Howard, Marshell, Peterson, C. Winslow, and the Secretary.

Honorary member: Dr. Stickney.

Minutes of the previous meeting read and accepted.

Moved by Dr. Peterson and seconded by Dr. Emerson, that the Secretary act as a committee of one to attend to the details of the annual meeting and dinner. Carried.

Moved by Dr. Bunker, and seconded by Dr. Hadcock, that the annual meeting and dinner be held at Young's Hotel. Carried.

Dr. Bunker then read a paper to which he had not given a title. It was a plea for more brave, honest, earnest co-operation amoug the members of tbe Association in doing their part in the furtherance of the public good, in spite of mercenary interests or reasons of policy.

After Dr. Bunker ceased reading, a pause followed which was broken by the essayist, who went on to speak of the importance of our profession, and that all its members should work for its recognition by Boards of Health, and we should unite in expressing our disapprobation of the Cattle Commissoiners' inefficiency and their having no rules for the disinfection of infected premises, dealing with suspicious cases, and the like. It is time this Association was up and doing in remedying existing evils, and getting better recognition of the value of our Association.

Dr. Winslow said that he thought that in time owners of animals and Boards of Health would consult veterinarians upon the best course to pursue in outbreaks of contageous animal diseases, without seeking advice from the Cattle Commissioners.

Mr. Stickney thought that the Cattle Commissioners' lease of life would soon be self-terminating if it continued in its present course.

Dr. Marshall thought the members of the Commission were very reasonable in their treatment of owners of stock.

Dr. Stickney said politics had too much to do with their action, and it makes a great deal of difference who owns the property upon which the Commission is administering. Even if they appreciate the conditions of things, which they often do not, they do not have the pluck to stand up and grapple with matters as they should. One member in particular might as well be a mop, for anyone could wring him out.

Dr. Howard asked the essayist if he recommended our acting as individuals, or as an Association?

Dr. Bunker advised acting as individuals, but as members of the Massachusetts Veterinary Association.

Dr. Howard said that our Association had investigated the Cattle Commission once, but he did not see that much had come of it.

Dr. Marshall moved that the essayist be given a vote of thanks. Seconded and carried.

Dr. Hadcock reported a case of melanosis in a roan horse. First noticed a swelling of the abdomen on the near side, one Thursday; gave a cathartic ball which acted nicely the next day, Friday, but he did not see him until Saturday. Saturday, the abdomen was very much swollen, and horse had colicy pains. Sunday morning Dr. Blackwood saw him in consultation; abdomen was very much distended with fluid; it was proposed to tap him, but after talking it over decided not to, horse showing symptoms of enteritis. He died Sunday night. Post-mortem made Monday morning. The abdomen contained a quantity of dark-colored fluid and melanotic tumors were found in the mesentary, liver, and spleen. The mesentary looked like a huge black sponge.

Dr. Peterson reported a case of fatal epistaxis in a heifer, at Sudbury. When Dr. Peterson arrived at the farm where the heifer was owned, he found a small stream of what looked like arterial blood flowing from both nostrils; she had bled about a bucketful. He injected six ounces of tincture of perchloride of iron into her nostrils, used cold water and tried plugging, but could not check the hemorrhage, she had lost two bucketfuls of blood by the time he left, and died the next day. He did not have an opportunity of making an autopsy, but she was opened by her owner, who said that he found no lesions to account for the trouble, still a professional man might have.

Dr. Bunker spoke of a horse which came under his observation where pieces of sponge had been plugged up both nostrils to stop the noise of whistling, which it effectually did.

Meeting then adjoined.

AUSTIN PETERS, *Secretary.*

KEYSTONE VETERINARY MEDICAL ASSOCIATION.

The regular meeting of the Keystone Veterinary Medical Association was called to order at 8. P. M., Dr. Hoskins in the chair.

The following members answered roll-call:

Drs. Bridge, Weber, Hoskins, Goentner and Drake.

The minutes of previous meetings were read and adopted.

The President, in absence of Board of Trustees, appointed Drs. Goentner and Drake to act with Dr. Weber on the resignations of Drs. W. L. Zuill, W. H. Ridge, Chas. S. Williams and C. H. Magill, with the following result:

REPORT OF THE BOARD OF TRUSTEES.

PHILADELPHIA, Pa., April 4, 1891.

We hereby report that we recommend the acceptance of the resignations of of Drs. W. L. Zuill, W. H. Ridge, Chas. S. Williams and C. H. Magill.

S. E. WEBER,
(Signed) M. W. DRAKE,
CHAS. T. GOENTNER.

It was moved and seconded the above be adopted. Carried.

Dr. Hoskins asked if mares had an increase in temperature during the period of gestation. Dr. Bridge answered, that he had noticed an increase of two degrees for the first two months.

Dr. Hoskins stated at seven months his mare had a temperature of 101 1-5 degrees and continued about the same until parturition.

Dr. Bridge said cattle always had a rise in temperature during gestation.

Dr. Hoskins read a paper before the Association, entitled, "The Necessity of a Uniform Standard and Title of Veterinary Medicine in America," which was well written, touching every point on the subject. A lively discussion followed. The essayist desired the Keystone Veterinary Medical Association to be among the first to advise a single standard of examinations in veterinary medicine and place itself on record in this direction. He thought other Associations would do the same, and the colleges would ultimately make recognition of it and extend their course to at least three sessions.

Dr. Goentner was doubtful if we could in any way influence the schools.

Dr. Glass, who had been called to the chair, took this opportunity of assuring the Association that the Veterinary Department of the University of Pennsylvania was always desirous of retaining the good-will of the profession, and did not wish at any time, or in any way, to run counter to the best views of Veterinary Associations. The recent move taken by the officials of that institution, was purely a personal matter, and not a college feeling. Dr. Weber was glad the Keystone Veterinary Medical Association was the first to advise the adoption of these measures, but could not see how it could be carried successfully to an end; and in recognizing the higher standard of the University of Pennsylvania, wished that others should have the same. He asked, "are the graduates of agricultural colleges recognized by the United States Veterinary Medical Association as regular graduates?"

Dr. Hoskins answered him "yes; that they were admitted to membersihp at Chicago September 17, 1881."

Dr. Bridge thought the step a desirable one, but it was difficult for the Association to express its opinion to the colleges for a higher standard of requirements.

Dr. Weber spoke of the State joining the colleges in taking this step.

Dr. Goentner said a body of qualified men to start a National Board of Examiners, and not allow recent graduates to enter unless they could pass the Board. If the different Associations would join and work together the point might be attained.

Dr. Hoskins said the people could be reached through public opinion; that the schools would not listen to the Keystone Veterinary Medical Association, but would, if all the societies would join and work for the same point. That if the Keystone Veterinary Medical Association would adopt a rule and not admit a member unless a three years' course had been pursued, he would vote for it.

Dr. Glass' views of the matter were that it should be a National Board of Examiners and not a State matter, as it would get into politics and favors be shown in granting the positions. Get the veterinarians at large interested; push it and keep at it.

Dr. Glass then compared the number of University of Pennsylvania graduates as smaller compared to the Canadian schools, as a result of the three years' course. He thought it would be advisable to stamp out all the schools and form a limited number of government schools, the same as in Germany; inasmuch as the veterinarian is the preventive and the physician the curer of desease.

Dr. Goentner made a motion that a committee be appointed to draft suitable resolutions, embodying the views of the Keystone Veterinary Medical Association, on the subject of a higher standard of veterinary medicine and a single Board of Examiners.

Seconded by Dr. Hoskins. Carried.

The President appointed the following committee:

Drs. Glas, chairman; Goentner and Weber.

Election of officers. The Secretary's place now being vacant, Drs. Kooker and Drake were proposed.

Dr. Kooker's name being withdrawn at his own request, Dr. Drake was elected by acclamation.

The meeting then adjourned.

M. W. DRAKE, *Secretary*,

OBITUARY.

E. NOSTRAND, D.V.S.

After a practice of over fifty years in the city of New York, Doctor Elbert Nostrand died of pneumonia on April 14th, 1891, at the advanced age of eighty-three years and one month. Born at Springfield, Long Island, he at an early age began practice in New York city, and was one of the first American veterinary graduates, receiving his diploma in 1865, from the New York College of Veterinary Surgeons. Dr. Nostrand even at his advanced age, in fact to within a few days of his sickness, was still in active practice, and many New Yorkers have often met him but a short time before his death while in the performance of his professional duties.

NOTICE.

POSITION WANTED.

Graduate 1875, officially employed, wishes to occupy his vacation as a manager or assistant. Apply, stating terms, to T. J. M. care of Sabiston & Murray, 916 Sixth Avenue, New York.